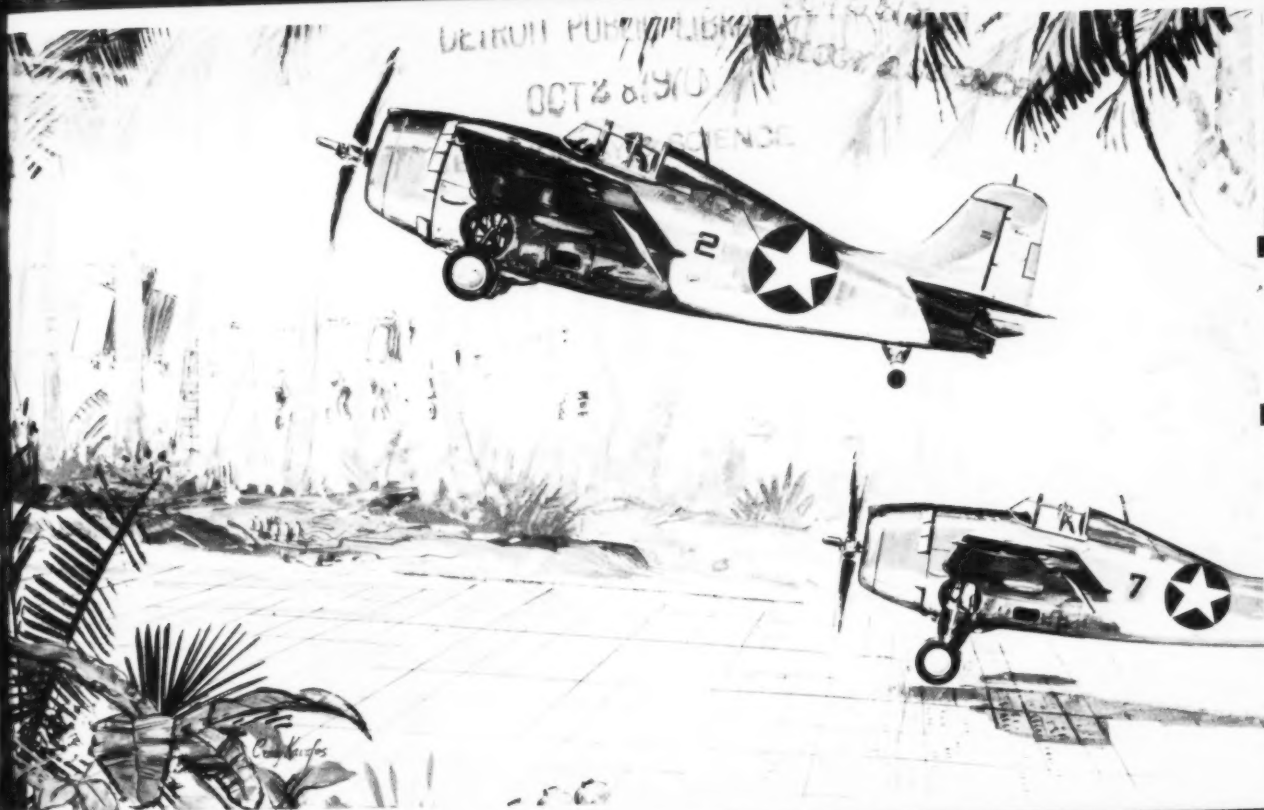


A Naval Safety Center Publication

approach

OCTOBER 1970 THE NAVAL AVIATION SAFETY REVIEW



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NAVAL AVIATION

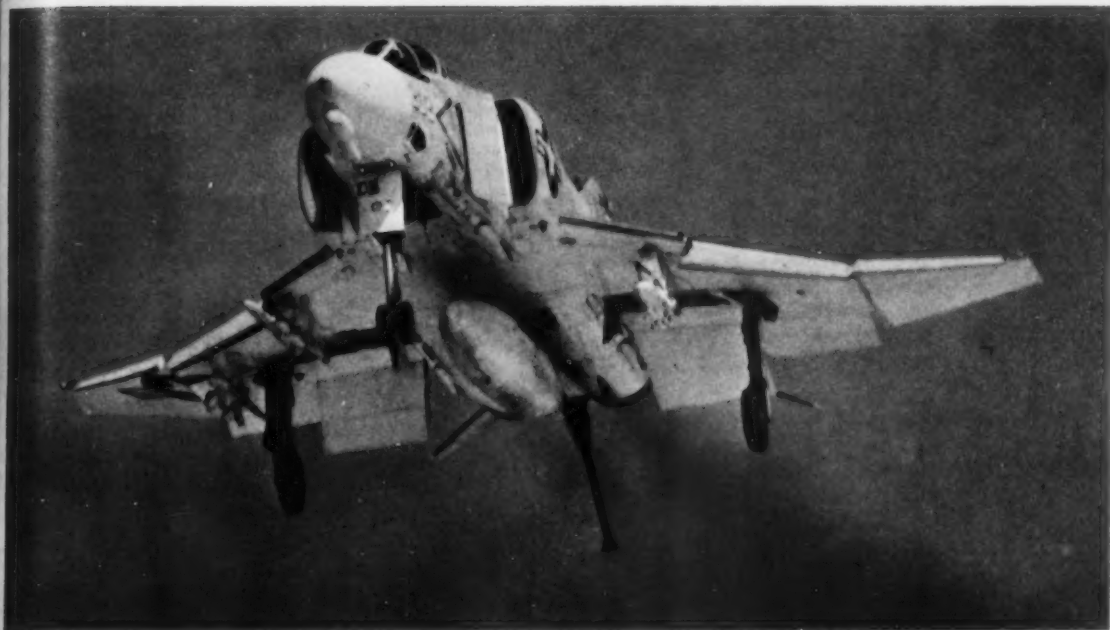
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SAFETY ONCE OVER LIGHTLY

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FY 70 ended several months ago but it may be beneficial to review some of the results of the past year as we work for improvement in safety during the remainder of FY 71.

It is appropriate at the beginning to note the unprecedented amount of support and attention which naval aviation safety received during FY 70. Aviation commands at all levels were very active in their efforts to provide operating personnel with the guidance and wherewithal for safe operations. During FY 70, for example, several safety standdowns were observed during which all aspects of flight safety were considered and analyzed at the operating level. There is ample evidence that the guidance provided was well received by operating personnel and that aviation safety during FY 70 represented an all hands effort.

Most readers are aware by this time that we failed to achieve our FY 70 goal of reducing the all-Navy major aircraft accident rate to 1.0 per 10,000 flight hours; however, we did score an important gain: *the all-Navy*

major aircraft accident rate decreased during FY 70 for the first time since FY 65. The reduction in the rate was modest — down to 1.36 from 1.41. Nevertheless, the upward trend of the last four years has at last been reversed and this offers the hope that we can look forward to a continuing, annual decline in the accident rate.

Although the decline in the accident rate during FY 70 was only a small fraction, it represents a reduction of 93 major aircraft accidents from FY 69. In addition, there were 43 fewer aircraft destroyed in FY 70 than in FY 69.

There are some other encouraging statistics from FY 70. For example, about 53 percent of all naval aviation operating activities were accident-free during the year. This should be sufficient to prove that reducing accidents is an attainable goal. These accident-free units represent a pretty good cross-section of naval aviation and many of them were engaged in very demanding operations. The annual report of one of these

accident-free squadrons is worth considering (see accompanying box) because it not only discusses the difficulty of operations but also gives an excellent indication of how the squadron managed to operate accident-free.

Another meaningful FY 70 statistic occurred in January 1970 when naval aviation turned in an accident rate of .98 — the lowest monthly accident rate for the entire year. The question arises — how did we do it? No one can be absolutely sure but most likely it was a direct result of a specific plan. A timely effort was organized Navy-wide in December 1969 to prevent a rise of accidents during January 1970. Virtually every squadron and station in the Navy participated in some type of post-holiday standdown or back-in-the-saddle program before resuming full flight operations after the holidays. The results were impressive — a January 1970 accident rate which was the lowest for the year.

Not all the FY 70 news was good however. Even though the trend of a rising accident rate was reversed, the year was marred by many avoidable accidents. Few of these accidents, if any, were of a new or unusual nature. Mostly, they were repeats of the same types of accidents which we have been experiencing for years. Some of these accidents are summarized in the following:

- Several mid-air collisions resulted from failure of pilots to keep good lookout.
- Several aircraft landed short of runway thresholds because pilots failed to properly control rate of descent.
- Several aircraft flew up canyons or ravines in areas of rising terrain and were unable to successfully reverse course.
- Several aircraft crashed when the pilots involved staged unauthorized airshows. In one case an F-4 stalled and spun during an attempted Immelman following a

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Approximately 53 percent of all naval aviation activities operated accident-free during FY 70. The report of one accident-free squadron is reprinted here because it clearly shows that aviation safety is an attainable goal:

"During FY 70 the squadron flew 8211 sorties in a combat zone for a total of 15,105 flight hours, of which 8331 hours were at night, with no operational or ground accidents. These sorties were flown on an around-the-clock basis, including many during the monsoon season, with limited navigational aids. Although over half of the pilots were first tour, their performance was exceptional due to an aggressive and comprehensive training program.

"This may be attributed to the continuing stress placed on NATOPS standardization, emphasis on safety and the use of proven safety procedures coupled with a keen sense of individual professionalism.

"Frequent safety council/committee meetings, safety notes in the plan of the day and flight schedule, safety quizzes by all division officers and designation of shop safety petty officers, all contributed to the safety record of the squadron as evidenced by no operational incidents due to maintenance error. The quality assurance division participated aggressively in combating unsafe practices by submitting 202 URs of which 25 involved safety of flight.

"The ground safety program, which included an aggressive ordnance qualification and certification program for handlers and loading teams, resulted in the loading and firing of over 28,000 Zuni rockets, 55,000 2.75-inch rockets, 5,280,000 rounds of 7.62mm ammunition, 130,000 rounds of 20mm ammunition and 12,000 Mk-45 para-flares without a ground incident involving mishandling of ordnance. In addition, although operating in combat in an extremely austere environment with limited facilities, the squadron received an outstanding on its last ordnance safety inspection."

maximum performance takeoff and climbout. In another case an F-4 and crew were lost when the pilot attempted an aileron roll at less than 100 feet of altitude.

- Several mid-air collisions occurred during ACM (Air Combat Maneuvering) and formation evolutions because pilots failed to control closure rates.

- Several aircraft crashed because pilots attempted VFR flight in weather conditions below VFR minimums.

- Several aircraft were involved in unintentional wheels-up landings.

- Several aircraft flew into the water following night shipboard launches. Pilot disorientation/distraction is suspected.

- Several aircraft were lost when pilots became disoriented/distracted in the night landing pattern and flew into the ground.

- Two aircraft crashed because pilots overrotated during takeoff.

- Two aircraft struck power lines and were substantially damaged when the pilots departed from briefed flight plans and engaged in low-level flight below 500 feet.

- One aircraft landed at the wrong airport and ran off an unexpectedly short runway.

- One F-4 was lost due to poor flight planning which resulted in fuel exhaustion.

- A UH-34D crashed because maintenance personnel failed to replace a servo motor on the pitch control system which was removed during maintenance work.

- An F-8 caught fire in flight and crashed. Suspected source of the fire was an accumulation of fuel which resulted from an unsuccessful attempted ground start before takeoff. Neither pilot nor maintenance personnel took any action to comply with NATOPS/MIM instructions for flushing/swabbing excess fuel before a subsequent start was achieved.

- An A-4E experienced a catastrophic inflight explosion which was caused by fuel leaking from a fuselage fuel tank filler cap which had not been properly secured. Investigation revealed that the aircraft was fueled by an unsupervised non-rated man who was accomplishing this task for the first time.

This is not a complete list of all FY 70 accidents in which personnel error was listed as a primary cause factor, but these have been selected because they illustrate what is meant by "avoidable" accidents. If we are to avoid accidents such as these and achieve a further reduction in the accident rate in FY 71, we must continue to give close attention to all aspects of both ground and flight operations. This means the active participation of all hands. Every individual must



recognize that his performance is crucial to success.

Many aviation commanders have expressed views during the last year on how aviation safety can be improved. We have borrowed freely from these views in compiling the following suggestions for improving safety in FY 71:

- *Educate and Train Personnel.* Educate personnel to understand what must be done and train them in the correct way to do it. This means everyone from the striker on the line to the flight leader. Emphasize:

- (1) Aircrew knowledge of basic pilot techniques, instrument scan, aircraft systems management, general operating instructions, personal/survival equipment and aviation physiology.

- (2) Maintenance Support and crew knowledge of shop and line operating instructions, individual job accountability, aircraft inspection, quality assurance, aviation ground support equipment operations and industrial safety considerations.

- *Set a Good Example.* Most individuals are more impressed by what is done than by what is said. Good words are likely to be discounted or ignored unless they are given more than lip service. If you are trying to sell those whom you supervise on the right way to do something, you must be prepared to consistently do it right yourself even though shortcuts may be more convenient at times.

- *Stimulate the Free Flow of Ideas.* Recognize good ideas and give them full consideration regardless of the source. Individual involvement in the safety effort is discouraged when ideas are ignored. Many apparently good ideas turn out to be useless but if you must veto an idea make sure the originator understands it's the idea which is being vetoed — and not the interest which produced it.

Encourage participation in the safety effort by all ranks. Ensure the active participation of the Enlisted Safety Committee as well as the Aviation Safety Council.

- *Manage Resources Efficiently.* Personnel and funds are becoming more limited without a corresponding reduction in tasks. This increases the potential for accidents. Some of the ways in which this accident potential can be decreased are:

- (1) Review personnel assignments and ensure each individual is in a slot where he can make his maximum contribution. The assignment of highly trained personnel to duties where their skills cannot be used is wasteful. Likewise, the assignment of inexperienced personnel to duties requiring a high level of training and experience is not so much wasteful as it is dangerous. Review the number and qualifications of supervisors versus the areas of responsibility. Ensure supervisors are aware of their



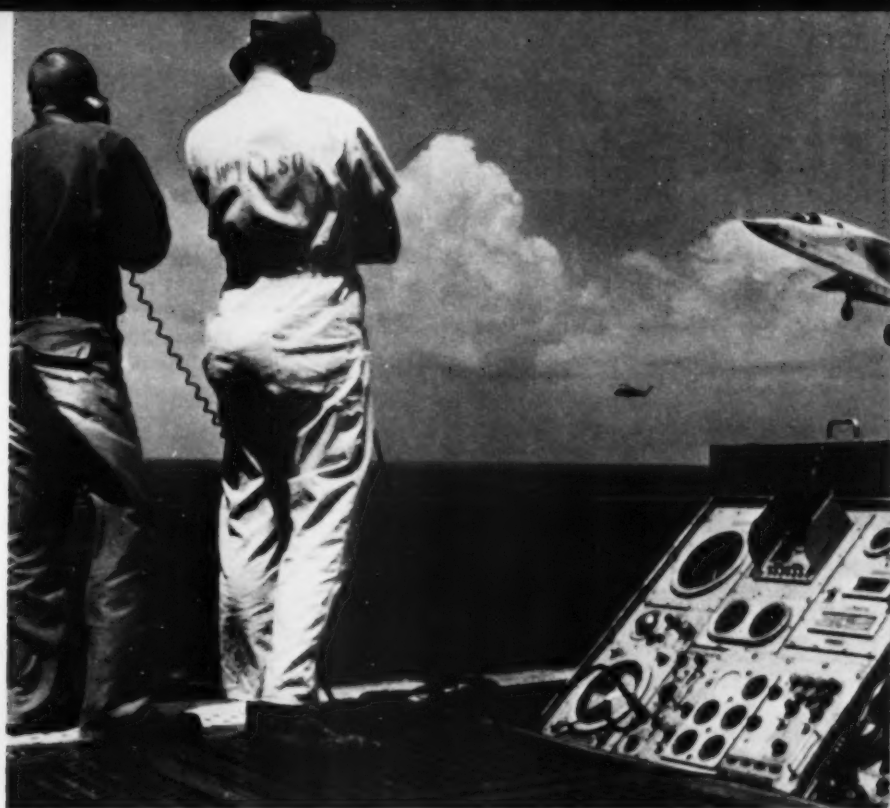
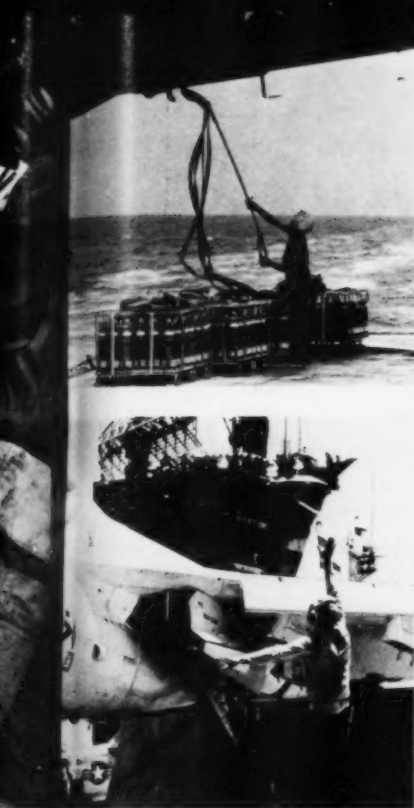
responsibilities and are, in fact, actively supervising.

- (2) Reductions in operating funds may lead to reduction of flight crew proficiency and a higher potential for accidents if flight hours are not precisely managed. Make certain flights are scheduled with meaningful objectives. Unauthorized maneuvers and other dangerous flight operations are unduly encouraged by "go get proficient" type flights.

- (3) Avoid fluctuations in the tempo of operations when possible. Increasing the tempo of operations may lead to undue haste in completing tasks and thereby create a tendency to live with discrepancies for the sake of expediency. On the other hand, decreasing the tempo may lead to loss of proficiency.

- *Pass the Word.* Insure that valuable information is passed on to those who can use it. URs and incident reports are prime examples. They provide excellent means for establishing the existence of trends, particularly in the maintenance area. Incident reports can also be used to pass on valuable information to aircrews on how various emergencies have been safely handled by other aircrews.

- *Emphasize the Importance of Standards.* We have many standards to guide us — NATOPS, MIMs, SOPs, etc. The importance of these standards is better understood today than ever before but we still have a significant number of personnel who regard standards as



an unnecessary restraint on their freedom of thought. We need to work continuously to educate personnel in the true value of standards. They are intended to make available to all — novice and pro alike — the benefit of our combined experience. These standards are not necessarily infallible but they are the best we have been able to collectively devise and publish. If they can be improved upon, they should be. And, if an individual can apply his thought processes to a problem and come up with a better way to do something, he owes it to his shipmates to make this information available to all hands. Another very important aspect of adhering to standards is that they provide us with a benchmark. When things go wrong we have a point of departure to use in analyzing the situation and coming up with a solution.

● *Stress Professionalism.* To be a professional presupposes that an individual is knowledgeable concerning the requirements for his job. It also means that an individual is expected to perform in a manner which is in the best interests of his chosen profession — naval aviation — even when it conflicts with

his personal desires of the moment. That is the root of the proposition when an individual is contemplating a departure from accepted standards. Take the matter of flathatting: It may be exciting but the individual contemplating such maneuvers knows it is not professional because it is not in the best interests of naval aviation. The flight leader who takes off without providing his wingman a complete brief may find this convenient but he knows it is not professional. Likewise, the maintenance man who performs an intricate task without reference to the MIM is not acting professionally. He may be able to do it correctly but over the long run, he knows this procedure will lead to faulty maintenance by someone, somewhere.

To sum up, we scored an important gain in FY 70 by reversing the trend of a rising accident rate. We can capitalize on this gain by continuing to give close attention to accident prevention during all phases of ground and flight operations. With the active participation of all hands, we can avoid many accidents of the type which marred FY 70 and make FY 71 the safest year in the history of naval aviation. ◀

Safety is a savings account. You can live on the interest.

NASL



Short Snorts

If at first you don't succeed, try to hide your astonishment.

Thunder and Lightning

THE only part of a thunderstorm that can't hurt you is the thunder and even that might shake you up a bit. Lightning has caused damage to a number of USAF and USN aircraft during 1970. Some of the lightning damage occurred in geographical areas where there were neither thunderstorms nor heavy precipitation areas being painted on radar scopes. Since several lightning strikes occurred in the clear areas adjacent to cumulus cloud activity, be wary of these areas, especially when the weather forecast shows a potential for unstable air. Each year we are warned about thunderstorms and severe weather areas and each year we experience damage or aircraft losses because the basic rules concerning thunderstorm operations do not receive adequate attention. There is no peacetime requirement for Navy aircraft to routinely fly through thunderstorms; therefore, information regarding flying activities in weather associated with thunderstorms should receive strong emphasis at current flight safety meetings. Remember, the odds are *not* in your favor when flying through thunderstorm areas.

*Adapted from USAF
Safety Management Newsletter*

Fire in the No. 1 Engine!

A CH-53A pilot was on a fam hop at home base and made a takeoff intending to stay in the pattern. As he climbed out and reached 400 feet a loud, unusual noise was heard emanating from No. 2 engine — followed shortly by engine failure. The pilot began his transition to single-engine flight and prepared to execute a single-engine landing on the main mat. The crew chief, observing No. 2 engine on fire, frantically told the pilot over the ICS that *No. 1 engine* was on fire. The pilot, who had turned back toward the field at the first sign of trouble, secured No. 1 engine and commenced a real autorotation to the nearest parking apron. He made a beautiful landing right on the desired spot.

Later in the recapitulation the crew chief said that the No. 1 engine was smoking but in reality he meant that No. 2 engine was smoking and appeared to be on fire. Most pilots have a rather high panic threshold in emergencies and go about their emergency procedures calmly *except* when that word *fire* is used. If you are going to use the word "fire" make sure you say what you mean and mean what you say.

In case some of you are curious about what happened to the No. 2

engine to begin with, it suffered a compressor stall due to FOD. No. 1 engine was A-OK and ran perfectly on turnup following the incident.

It Pays to Have an Alternate Plan

AN F-4B pilot called for a long field arrested landing into the Mk-21 arresting gear (located 6400 feet from the approach end) on a 10,000-foot, wet runway. The relative wind was 340 degrees at 10 to 15 knots. The drag chute was not deployed and braking was not initiated until passing the arresting gear after a hook skip. The port tire blew and the aircraft departed the runway left of centerline and came to rest 671 feet beyond the threshold lights and 96 feet left of the runway centerline.

The cause factors of this incident were:

- The pilot's failure to deploy the drag chute on landing.
- The pilot's failure to initiate braking prior to the arresting gear.
- Failure of airfield facilities personnel to rig the overrun gear when changing duty runways.

The commanding officer noted that an incident of this type indicates the need for all pilots to make decisions prior to landing as to their primary method of

stopping the aircraft and their possible alternatives if the primary method fails.

Aircrews concerned have been briefed that the drag chute will be used for all long field arrested landings and normal braking will be commenced at appropriate airspeeds.

Poor Headwork

AN F-4B was started, pretaxi checks were completed and then the plane captain attempted to remove the chocks. However, he discovered that the port chock would not budge. This situation resulted from the fact that maintenance personnel had recently changed the port tire and had lowered the tire in such a way as to make chock removal difficult, if not impossible.

The plane captain surveyed the situation and decided to have the pilot taxi forward over the chock. At the plane captain's direction, the pilot added more than normal power in an attempt to taxi over the chock. The resultant jet blast blew the folded wing on an F-4J (parked on the line behind the F-4B) past the folded position, causing considerable damage to the aircraft.

The Commanding Officer made the following comment in his endorsement to the report.

"This incident could and should have been prevented by the application of minimum standards of headwork on the part of the pilot, the plane captain and troubleshooter division supervisory personnel. This is a supervisory error incident and a graphic example of complete disregard for proper operating practices under the guise of expediency."

This incident proves once again that haste makes waste.

"THE GIMMICK"

A GOOD idea is always well received by conscientious naval personnel. Here is an idea that merits application not only within the framework of an activity's safety campaign, but also as a part of the everyday routine. The Safety Officer of VP-30 had the following remarks printed on some cards, then handed them out to squadron personnel as the situation warranted. The card stated:

"I just saw you doing something that could have caused an accident. You may not even realize you did it but think over what you've done in the last few minutes and you'll probably recall what I saw.

"I am giving you this card as part of our campaign to make all of us SAFETY CONSCIOUS. Keep it until you see someone doing something in an unsafe way and then hand it to him.

"P.S. — I HOPE I DON'T GET THIS CARD BACK!"

Unintentional Rocket Firing

AFTER pulling off the target following my first dummy rocket run in a TAF-9J, I decided to save time on the next run and turn all the necessary switches to the ready positions. I selected rockets and stations 3 and 4, then turned the master armament switch to ON. As I did, a 2.75 inch rocket whistled off into the flatlands. Only chance prevented it from hitting the spotting tower or the aircraft ahead of me in the pattern.

An electrical short was found which connected the master armament switch to the rack, bypassing the pickle on the stick.

I recommend that all pilots and especially those who fly older aircraft, follow NATOPS and flight training instructions to the letter, particularly when using live ordnance. In addition, flight leaders should brief that the aircraft must be pointing at the target with no one in front of it before the master arming switch is turned ON or guns are switched to READY and pilots should ensure such briefings are heeded.

Most ordnance safety

precautions are the result of hard-learned experience. They should be complied with to the letter, regardless of the model aircraft flown.

Autorotations

SINCE the early "fifties" helicopter pilots have groused and griped (friendly like) at squadron C.O.s and seniors in the chain because the practice of full autorotations is prohibited. The policy against full autos, of course, is that autorotations with power recoveries are more than enough insurance against that rare time when a helo pilot has an engine failure emergency and must execute autorotation to a landing. Advantages of power recoveries terminating the practice maneuver far outweigh the disadvantages, realistically, in carrying the practice autorotation to the deck. So all of you helicopter pilots swallow your pride, religiously practice your autorotations with power recoveries and you will be prepared for that one chance in thousands when you are faced with the "real McCoy." ◀

FAA Advisory Circular 00-30 of March 1970 was issued to bring to the attention of pilots and other interested personnel certain rules of thumb for avoiding or minimizing encounters with CAT (clear air turbulence). The substance of this Advisory Circular is reprinted below:

Rules of Thumb for Avoiding or Minimizing Encounters with

CAT

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CAT is officially defined as "all turbulence in the free atmosphere of interest in aerospace operations that is not in or adjacent to visible convective activity (this includes turbulence found in cirrus clouds which are not in or adjacent to visible convective activity)." This definition was published in the Department of Commerce Report of the National Committee for Clear Air Turbulence dated December 1966.

Turbulence in clear air is especially troublesome because it is usually encountered unexpectedly and is without visual evidence to warn pilots. Meteorological services know little about the cause of CAT, thus their forecasts are not sufficiently accurate to allow pilots to avoid it at all times.

The National CAT Committee stated in its 1966 report that the requirement for airborne remote detection should be given high consideration; although forecasting for CAT is improving, precise forecasts of location and time of local patches of CAT do not appear feasible, any more than times and positions of individual small local thunderstorms can be forecast with pinpoint accuracy. For this reason an airborne device is needed to detect and locate CAT sufficiently ahead of the aircraft to permit the pilot to take evasive action or to prepare for penetration. If such a system could be developed, it would permit pilots to avoid CAT with reasonable success as they now avoid thunderstorms and squall line turbulence using radar. Closely related to the importance of airborne detection is the requirement for increased accuracy in the prediction of CAT areas so that pilots can plan for avoidance during the flight planning stage. (The Report of the National

Committee for Clear Air Turbulence dated December 1966 can be obtained from the Superintendent of Documents, U. S. Government Printing Office, price 35 cents.)

In November 1969 the Department of Commerce published the Federal Plan for Clear Air Turbulence. This plan focuses on CAT as a serious atmospheric problem that is of concern to civil and military aviation services. It describes the coordinated efforts of the Department of Commerce, Defense and Transportation (FAA) and of the National Aeronautics and Space Administration to solve this mutual problem.

Until an airborne CAT detector can be developed and placed in use, pilots are urged to use the "Rules of Thumb for Avoiding or Minimizing Encounters With Clear Air Turbulence" which are printed as part of this article. These guidelines were developed by ICAO's (International Civil Aviation Organization) Sixth Air-Navigation Conference of April/May 1969. The Rules of Thumb were approved by the ICAO Air-Navigation Commission and distributed to all countries who are members of ICAO for dissemination to concerned aviation personnel.

Recommendation

All pilots and other personnel concerned with flight planning should carefully consider the hazards associated with flight through areas where pilot reports or aviation weather forecasts (CAT forecasts) indicate the presence of clear air turbulence, including mountain wave turbulence. The following information is intended to assist all pilots in avoiding potentially hazardous clear air turbulence areas during flight.

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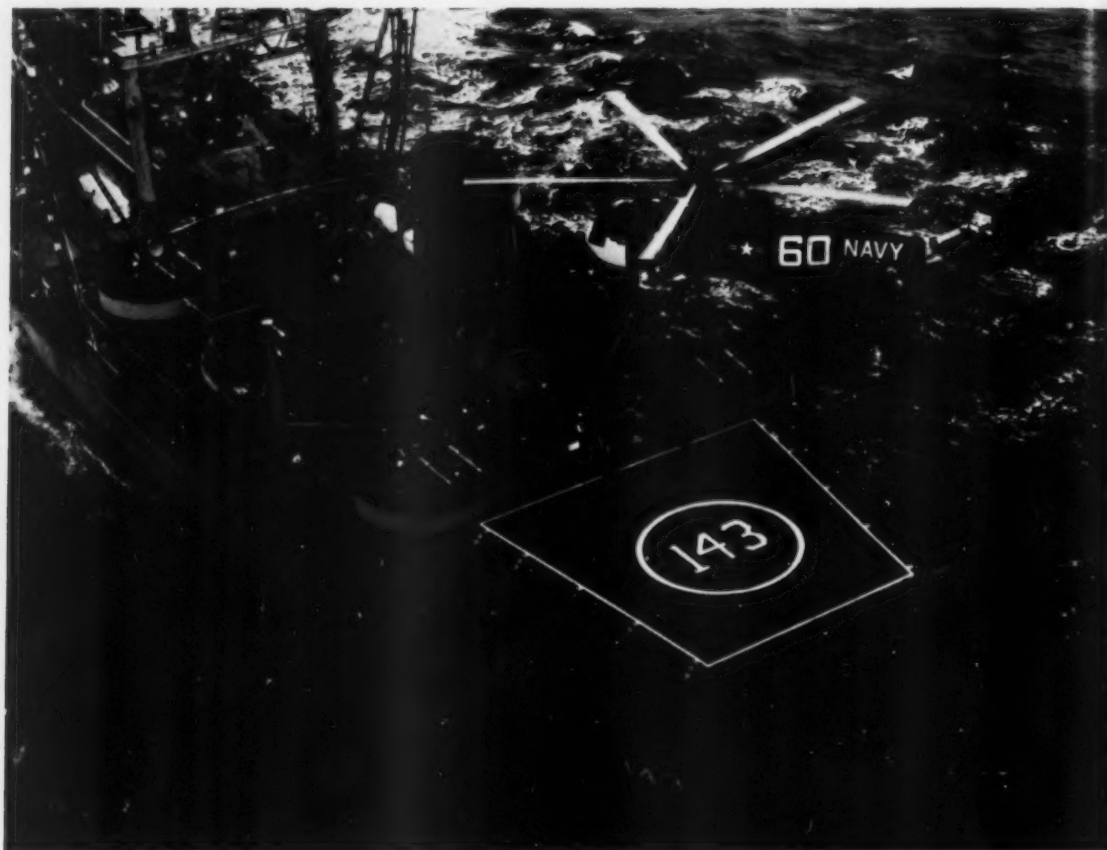
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Rules of Thumb

- Jet streams stronger than 110 knots (at the core) are apt to have areas of significant turbulence near them in the sloping tropopause above the core, in the jet stream front below the core and on the low-pressure side of the core. There are frequently strong wind shears in these areas.
- Wind shear and its accompanying clear air turbulence in jet streams is more intense above and to the lee of mountain ranges. For this reason, clear air turbulence should be anticipated whenever the flight path traverses a strong jet stream in the vicinity of mountainous terrain.
- On charts for standard isobaric surfaces, such as 300 millibars, if 20-knot isotachs are spaced closer together than 60 nautical miles there is sufficient horizontal shear for CAT. This area is normally on the poleward (low-pressure) side of the jet stream axis but in unusual cases may occur on the equatorial side.
- Turbulence is also related to vertical shear. From the winds-aloft charts or reports, compute the vertical shear in knots-per-thousand feet. Turbulence is likely if it is greater than five knots-per-thousand feet. Since vertical shear is related to horizontal temperature gradient, the spacing of isotherms on an upper air chart is significant. If the 5°C isotherms are closer together than two degrees of latitude (120 nautical miles), there is usually sufficient vertical shear for turbulence.
- Curving jet streams are more apt to have turbulent edges than straight ones, especially jet streams which curve around a deep pressure trough.
- Wind-shift areas associated with pressure troughs are frequently turbulent. The sharpness of the wind-shift is the important factor. Also, pressure ridge lines sometimes have rough air.
- In an area where significant clear air turbulence has been reported or is forecast, it is suggested that pilots adjust speed to fly at recommended rough air speeds on encountering the first ripple, since the intensity of such turbulence may build up rapidly. In areas where moderate or severe CAT is expected, it is desirable to adjust airspeed prior to encountering turbulence.
- If jet stream turbulence is encountered with direct tailwinds or headwinds, a change of flight level or course should be initiated since these turbulent areas are elongated with the wind and are shallow and narrow.
- If jet stream turbulence is encountered in a crosswind, it is not so important to change course or flight level since the rough areas are narrow across the wind. However, if it is desired to traverse the clear air turbulence area more quickly, either climb or descend after watching the temperature gage for a minute or two. If temperature is rising – climb; if temperature is falling – descend. Application of these rules will prevent following the sloping tropopause or frontal surface and staying in the turbulent area. If temperature remains constant, the flight is probably close to the level of the core, in which case either climb or descend as convenient.
- If turbulence is encountered in an abrupt wind-shift associated with a sharp pressure trough line, establish a course across the trough rather than parallel to it. A change in flight level is not so likely to alleviate the bumpiness as in jet stream turbulence.
- If turbulence is expected because of penetration of a sloping tropopause, watch the temperature gage. The point of coldest temperature along the flight path will be the tropopause penetration point. Turbulence will be most pronounced in the temperature-change zone on the stratospheric (upper) side of the sloping tropopause.
- Both vertical and horizontal wind shear are, of course, greatly intensified in mountain wave conditions. Therefore, when the flight path traverses a mountain wave type of flow, it is desirable to fly at turbulence-penetration speed and avoid flight over areas where the terrain drops abruptly, even though there may be no lenticular clouds to identify this condition.

Note: In this country, civil forecasts of areas of clear air turbulence are made by the Weather Bureau and disseminated (1) in Area Forecasts (FA) over teletypewriter Service A every six hours, (2) on High Level Significant Weather Facsimile charts available every six hours and (3) on a non-scheduled basis as Inflight Advisories (AIRMETS and SIGMETS). Inflight advisories are transmitted over Service A when moderate or greater CAT is forecast or when severe or extreme CAT has been reported. These are made available to aircraft over FSS (Flight Service Station) radio and, in addition, SIGMET Alerts are broadcast by enroute traffic controllers. ◀



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The State of Vertical Replenishment

VertRep as used in this article includes all vertical lift operations whether by Marines, in resupply or amphibious operations ship-to-shore, or Navy in operations ship-to-ship.

VertRep (vertical replenishment), which is moving into the second decade of existence, needs refinement. The capability of moving supplies, equipment and material with the present generation of helicopters has outstripped current operating procedures. For this reason VertRep procedures need close scrutiny. There is a need for standardization. Shipboard facilities need upgrading and shipboard personnel training in the specific areas of LSE (landing signalman enlisted) duties and other crew assignments (firefighting, helo day and night operations, tie-down procedures, hoisting capabilities, hand signals and refueling operations) needs

broadening. Better methods of determining the weight of sling loads need to be established. More reliable hardware (slings, hooks and pendants) needs to be produced, and flight test programs for establishing optimum airspeeds for different loads involving H-46 and H-53 models primarily engaged in VertRep must be initiated.

None of the needs addressed are original. They have been discussed in conferences, correspondence and messages and finally compiled for this article. Improvements in all of the areas would enhance safety many times over in VertRep operations. The concept is advancing but the safety aspects, operating procedures and reliability of some equipment are lagging.

Operating Procedures

At the present time neither the Marines nor the Navy have a single document which is the sole source for external load operations. Various aspects of VertRep are

found in SPLASH (Shipboard Platforms for Landing and Servicing Helicopters), some NATOPS Manuals, FMFM 3-3 (Helicopterborne Operations), NWP 38D (Replenishment at Sea), MCDEC DB 2-68 (Cargo Handling With CH-46 and CH-53 Helicopters) and NWIP 41-6(c) (Non-Aviation Ship Helicopter Operations). Perhaps there is a contingent that feels the establishment of a VertRep SOP manual is not desirable; however, one can't help but think that advantages of such a document would far outweigh its disadvantages.

Shipboard Facilities

NAVAIRSYSCOM has compiled a loose-leaf manual, *Helicopter Non-Aviation Ship Certification Program*, which contains a wealth of information on this important part of VertRep operations. This manual includes OPNAVINST 3120.28 (Certification of Aviation Facilities on Aviation and Non-Aviation Ships), NAVMATINST 3120.1 (Procedures and Responsibilities for Certification of Aviation Facilities in Non-Aviation Ships), NAVAIRSYSCOM Helicopter Operating Facilities Bulletin No. 1, NAVAIRSYSCOM Helicopter Support Facilities Bulletin No. 1 and a sample illustration from SPLASH.

Many of the plates depicted in SPLASH indicate that uncertified ships outnumber those that are certified. A waiver must be granted by the appropriate Fleet Commander to permit helo operations from non-certified decks. However, certified or not, these plates, illustrating the deck markings, lighting, obstructions and helicopter services available aboard non-aviation ships, are a boon to the vertrep pilot.

Prestaging of cargo to be helicopter lifted is common practice because today's helos can transport cargo off the deck more quickly than it can be moved from the holds to the helicopter platform. Procedures which have been developed for the new class AFS to reduce the amount of prestaging should be expanded to include older classes of ships as money for alterations permits. It is still quite common for helicopter pilots to take off vertically with insufficient room to land immediately if they encounter engine or control problems. It is a far more demanding maneuver to land a helicopter in an area surrounded by stacks of cargo than it is to take off from the same spot. Add in turbulence, glare, darkness or control problems and it's almost impossible.

Personnel

Shipboard personnel of non-aviation ships need schooling, training and experience in matters concerning helicopter limitations, platform security, firefighting, fueling and landing signalman duties. Helo pilots, who frequently are "blind" during certain maneuvers, depend on the LSE to ensure they are, in fact, clear of

obstructions, in a safe position when picking up cargo from a high hover and that their main landing gear is completely over the landing platform before landing.

Weighing Equipment

Although overloading helicopters is not nearly as prevalent today with the H-46 as it once was with the H-34, there has been one known accident in the past year and one other incident caused by overloads. Yet, every VertRep pilot literally has his life hanging by the weight of the load he's picking up — and the lives of many others on the platform below him. It is suggested that two rather simple devices could be employed. One would be scales built into the ship's deck and the other would be a strain gage on the helicopter cable. With the latter the pilot would know as soon as he began lifting whether the cargo team had overloaded him or not. Also, pilots must advise cargo loading teams what their maximum load can be for existing meteorological conditions. A helicopter, for example, is not able to pick up anywhere near the same load on a hot, windless day as it can handle on a cold, winter day with 30 knots of wind. After the pilot has advised all hands of the maximum weight which he can carry, it is even more important that the cargo handlers ensure this weight is not exceeded.

Hoisting Hardware

Concern has been raised by many operators about the hooks, slings and pendants. Malfunctions/failures of cargo straps and slings, while carrying external loads, have caused many loads to be dropped and lost, as have cargo hoist hooks which have mysteriously opened in flight. Frequently, some portion of the external hardware has slammed into the aircraft causing damage to the airframe or, even worse, snapped into the rotor blades. To enhance safety in VertRep operations, better hoisting equipment reliability is needed.

Flight Testing Cargo Loads

A test program of representative loads to determine optimum airspeeds and sling lengths seems appropriate for those helo models presently used primarily for VertRep. Future buys might well include contractor demonstrations during NPE (Navy Preliminary Evaluation) and both contractor and Navy tests during FIP (Fleet Introductory Program).

Summary

VertRep is big business now and is growing bigger all the time — and as such should receive priority attention to make it a more dynamic, efficient and safer operation. This requires standardizing procedures, optimizing facilities, expanding shipboard personnel training and insisting on better reliability of hoisting equipment. ◀

Into the Clouds with Gun and Camera

OR
Flying safety is not only for the birds.



12

Introduction

"Another good month. In all, a total of 35 accidents were reported, only six of which were avoidable. These represented a marked improvement over the month of November during which 84 accidents occurred, of which 23 were avoidable. This improvement, no doubt, is the result of experienced pilots with over 100 hours in the air forming the backbone of all the units . . ."

The report was signed "C. St. John-Culbertson, Royal Flying Corps, Colonel" and was dated 21 December 1917.

Resume Of Accidents

Avoidable Accidents

1. There were six *avoidable* accidents this month.
 - a. The pilot of a Shorthorn, with over seven hours of experience, seriously damaged the undercarriage on landing. He failed to land at as fast a speed as possible as recommended in the Aviation Pocket Handbook.
 - b. A B.E. 2 stalled and crashed during an artillery exercise. The pilot had been struck on the head by the

ACCIDENT prevention has come a long way since Wilbur and Orville first got us all into this business; however, we still have accidents. Here are a few thoughts, findings and recommendations reprinted from a Royal Flying Corps monthly safety report dated December 1917 which show that accidents and accident reporting procedures are no new problem.

semaphore of his rear seat observer who was signaling to the gunners.

c. Another pilot in a B.E. 2 failed to get airborne. By an error of judgment, he was attempting to fly at mid-day instead of at the recommended best lift periods which are just after dawn and just before sunset.

d. A Longhorn pilot lost control and crashed in a bog near Chipping-Sedbury. An error of skill on the part of the pilot in not being able to control a machine with a wide speed band of 10 mph between top speed and stalling speed.

e. While low flying in a Shorthorn, the pilot crashed into the top deck of a horse-drawn bus near Stonehenge.

f. A B.E. 2 pilot was seen to be attempting a banked turn at a constant height before he crashed. A grave error by an experienced pilot.

Unavoidable Accidents

2. There were 29 unavoidable accidents; from which the following are selected:

a. The top wing of a Camel fell off due to fatigue failure of the flying wires. A successful emergency landing was carried out.

b. Sixteen B.E. 2s and nine Shorthorns had complete engine failures. A marked improvement over the November figure.

c. Pigeons destroyed a Camel and two Longhorns in mid-air strikes.

Cost Of Accidents

Accidents during the last three months of 1917 cost 317 pounds, 10 shillings, sixpence, money down the drain and sufficient to buy new gaiters and spurs for each and every pilot and observer in the Service.

Accident Briefs

No. 1 Brief

No. 912 Squadron 3 December 1917

Aircraft type - B.E., 2C No. xy 678 Total solo - 4.20

Pilot - Lt. J. Smyth-Worthington, Solo in Type - 1.10

The pilot of this flying machine attempted to maintain his altitude in a turn at 2500 feet. This resulted in the aeroplane entering an unprecedented maneuver, entailing a "considerable loss of height." Even with full

power applied and the control column fully back, the pilot was unable to regain control. However, upon climbing from the cockpit onto the lower mainplane, the pilot managed to correct the machine's attitude and, by skillful manipulation of the flying wires, successfully sideslipped into a nearby meadow.

Remarks - Although, through inexperience, this pilot allowed his aeroplane to enter an unusual attitude, his resourcefulness in eventually landing without damage has earned him a unit citation.

R. F. C. Lunsford-Magnus is investigating the strange behaviour of this aircraft.

No. 2 Brief

No. 847 Squadron

19 December 1917

Aircraft type - Spotter Balloon J17983 Total solo - 107.00

Pilot - Capt. ***, Solo in type - 32.10

Captain *** of the Hussars, a balloon observer, unfortunately allowed the spike of his fulldress helmet to impinge against the envelope of his balloon. There was a violent explosion and the balloon carried out a series of fantastic and uncontrollable maneuvers, while

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rapidly emptying itself of gas. The pilot was thrown clear and escaped injury as he was lucky enough to land on his head.

Remarks — This pilot was flying in full dress uniform because he was the Officer of the Day. In consequence, it has been recommended that pilots will not fly during periods of duty as Officer of the Day.

Captain *** has requested an exchange posting to the Patrouille d'Alpes, a well-known mule unit of the Basques.

No. 3 Brief

Summary of No. 43 Brief dated October 1917.

Major W. deKitag-Watney's Nieuport Scout was extensively damaged when it failed to become airborne.

The original Court of Inquiry found that the primary cause of the accident was carelessness and poor airmanship on the part of a very experienced pilot.

The Commandant General, however, not being wholly convinced that Major deKitag-Watney could be guilty of so culpable a mistake, ordered that the Court should be reconvened.

After extensive inquiries and lengthy discussions with the Meteorological Officer and Astronomer Royal, the Court came to the conclusion that the pilot unfortunately was authorized to fly his aircraft on a day when there was absolutely no lift in the air and could not be held responsible for the accident.

The Court wishes to take this opportunity to extend its congratulations to Major deKitag-Watney on his reprieve and also on his engagement to the Commandant General's daughter, which was announced shortly before the accident.

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THX KXY

Vxnx though our typewriter is an old model it works quite well except for one of the keys. It is true that there are forty keys that function well enough, but just one key not working makes all the difference.

Sometimes it seems our naval aviation team is rather like this typewriter — not all the keys people are working properly.

You may say to yourself, "Well, I am only one person, I won't make or break it," but it does make a difference because a team requires the participation of every person to be effective.

So the next time you think you are only one person and that your efforts are not needed, remember our typewriter.

RAAF Flight Safety Review

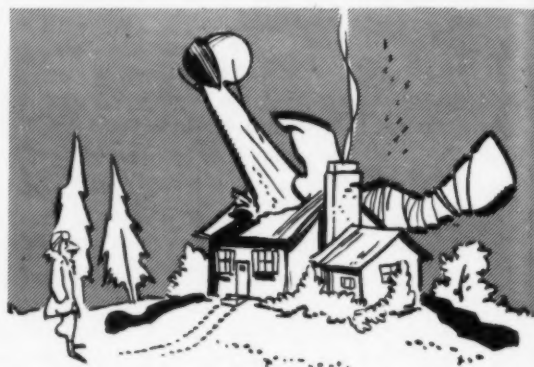
Flying Safety Tips

Horizontal Turns

To take a turn, a pilot should always remember to sit upright, otherwise he will increase the banking of the aeroplane. He should *never* lean over.

Crash Precautions

Every pilot should understand the serious consequences of trying to turn with the engine off. It is much safer to crash into a house when going forward



than to sideslip or stall a machine with engine troubles.

Passengers should always use safety belts, as the pilot may start stunting without warning. Never release the belt while in the air or when nosed down to land.

Engine Noises

Upon the detection of a knock, grind, rattle or squeak, the engine should be at once stopped. Knocking or grinding accompanied by a squeak indicates binding and lack of lubricant.

Would You Believe?

EVER since aircraft have been going to sea on ships, pilots have always been suspicious of aviation fuels. One way to check it is to put some gas in a glass jar and swirl it around. Any impurities, such as water or dirt, will congregate in the center of the "whirlpool."

In what must be the best gag-of-the-year, HC-6 Detachment Officer in Charge LCDR Don Schwitzer, USN, carefully inspects the gas in photo (1) as CWO Tom Reid, and ABF2 Holland of USS Guam (LPH-9) Av fuels gang watch intently. After buying the gas as 4.0, photo (2) LCDR Schwitzer looks on incredulously as CWO Reid proceeds to drink it. Having been clearly "had," photo (3), CWO Reid savours the flavor while it lasts as LCDR Schwitzer says something like, "It looks like I fell for the old bug-juice-in-the-fruit-jar routine!"

This is not recommended, however, as normal practice for fuel examination!!



It looks dull, he said clearly.



It tastes great! he said sweetly.



Trying to blow my mind? he boomed.

A CLOSE CALL

SIMULATION within the military is an oft used training method and, generally, the more realistic the simulation the better. In SAR (search and rescue) work involving helicopters there are many ways to simulate real life, real time rescues. The story which follows demonstrates this.

There was a transient squadron aboard NAS Westcoast for a couple of weeks of shootin' practice and other training. To make the training more realistic it was decided to simulate a SAR, not only from the standpoint of the SAR crew but also from the standpoint of the rescuee — a live pickup. A pilot from the visiting squadron was taken by vehicle to a remote but accessible site in mountainous terrain. He was left there and the practice alert was sounded. The SAR crew promptly and expeditiously manned their trusty H-34 and departed to the rescue. Aircraft from the "downed" pilot's squadron guided the helicopter to the location of the rescuee. The exercise called for the "downed" pilot to be picked up and returned to Homeplate.

The helicopter crew quickly spotted the "survivor" and established a hover. The survivor slipped into the sling and extraction was begun. As the sling was being hoisted, the helicopter began to lose rotor RPM and

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started to settle. The HAC (helicopter aircraft commander) eased off some collective and increased throttle but the helicopter continued to settle. Just before the helo contacted the ground on a fairly level ledge, the survivor was hoisted into the chopper. The tail rotor struck a small scrub tree as the helicopter touched down. The 90-degree gearbox was broken and the helo pivoted 90 degrees clockwise, which placed the tail beyond the ledge and on the side of a slope. The photograph shows the position in which the helicopter came to rest — stopped by some small scrub trees and brush. All hands on board evacuated without injury. Subsequently the H-34 was hoisted out by an H-53 and returned for repairs.

A thorough inspection of the engine was conducted with no discrepancies discovered. Cylinders were borescoped and checked for normal compression, the carburetor was inspected, fuel and oil filters were checked, carburetor air filter was checked, intake and exhaust systems were checked and the engine was run for 15 minutes. After the ground checks were completed the aircraft was test flown and, with a power setting of 43 inches MAP and 2700 rpm, an audible popping occurred. After shutdown, a pint of oil was found in one

cylinder. The engine and carburetor were sent to NARF for DIR (disassembly inspection report). At the same time an oil sample revealed an excess of aluminum and iron content.

Meteorological conditions were also carefully considered and, although no conclusive evidence was uncovered, it is highly suspect that adverse eddies existed at the scene of the rescue which were contributory to the unintended landing. Notice in the photograph the proximity of the higher slope to the ledge where the pickup occurred. It is entirely possible that the accident happened because of the combination of some power loss and eddy effect. The pickup site was on the lee side of the higher terrain and wind direction was over the top. An article, "Mountain Flying," in the Jan 1970 issue of *APPROACH*, points out (among other things) the importance of power checks in helicopters to ensure that power available is more than power required for hovering or landing in mountainous terrain. The AAR (aircraft accident report) and endorers did not indicate whether or not this check was performed. Helicopter pilots are reminded again that no SAR operation at higher altitude is a piece of cake. Caution and conservatism are extremely important. ◀



C-5A

Exhaust Velocity

Large, high-bypass ratio turbofan engines present military airfields as well as the commercial aviation industry with new problems in blast effects. C-5 operations create hazards which require a high degree of alertness on the part of pilots of other aircraft and of ground personnel if safe operations are to be achieved.

PRELIMINARY Air Force exhaust velocity surveys conducted on the C-5A indicated that predicted data presented in technical orders were inaccurate. As a result, Lockheed Aircraft Corporation was requested to conduct tests to obtain more extensive exhaust velocity data over a wide range of power settings. These tests were conducted on 15 Dec 1969 at Edwards Air Force Base.

For these tests, two pitot static probes and thermocouples were mounted approximately 12 feet in front of a C-5A tow vehicle. One probe was mounted 5 1/2 feet above the ground and the other 16 feet above the ground. These probes were connected to two airspeed indicators mounted in the tow vehicle cab.

Surge tanks were used in each line to dampen anticipated indicator fluctuation. Velocity measurements were made along the C-5 fuselage

centerline, No. 3 engine centerline and along the centerline between the No. 3 and No. 4 engines. These centerlines were chosen in order to obtain the widest range of velocities possible.

Data were collected at various distances aft of the aircraft using the four power settings shown (per engine), zero datum being at the bypass discharge of the engine.

- IDLE POWER — EPR (Engine Pressure Ratio) 1.2. 1850 pounds of thrust.

- BREAKAWAY POWER — Setting required to start the aircraft moving when at maximum weight on a ramp with three degrees of upslope after a cold soak period of at least 24 hours at -45°F. EPR 3.4. 25,100 pounds of thrust. 769,000 pounds gross weight.

- TAXI POWER FOR MAXIMUM GROSS WEIGHT

AIRCRAFT — EPR 1.64. 6300 pounds of thrust.

• **TAKEOFF POWER** — EPR 5.08. 40,000 pounds of thrust.

Data for the diagrams which are shown were taken from the engine exhaust and extended until the exhaust velocity reached 35 mph and the temperatures lowered to 100°F, these being acceptable human limits established in AFM (Air Force Manual) 84-6. Average velocity levels shown can vary as much as ± 5 mph due to surges and fluctuations. Temperatures may vary as much as $\pm 5^\circ$.

A review of C-141 jet exhaust velocity data at takeoff power is presented in Fig. 1 for use as a comparison with C-5A test results. MAC (Military Airlift Command) has

been operating the C-141 for several years on a worldwide basis without any serious exhaust velocity problems, although pilot technique has been an important factor. All temperature and velocity profiles are for four engines running, although the temperature profile is shown on one side of the aircraft and velocity on the other. As shown here, the exhaust velocity would be damaging if high power were to be carelessly applied in congested ramp or terminal areas. Note in Fig. 1 that the C-141 exhaust temperature is 150°F at 150 feet distance; yet, as shown in Fig. 2, the exhaust temperature for the C-5 at takeoff power is less than 100°F at that same distance.

The foregoing operating (power) conditions for the C-5A are discussed below in order of decreasing thrust and associated lower exhaust velocities. Continued

C-141 JET WAKE (Takeoff Power)

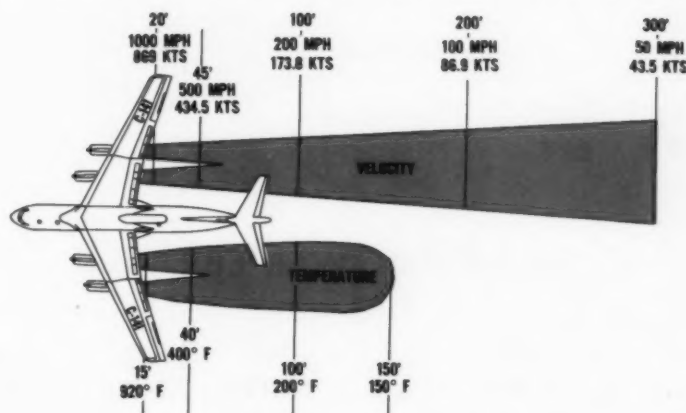


Fig. 1

C-5A JET WAKE (Takeoff Power EPR-5.08)

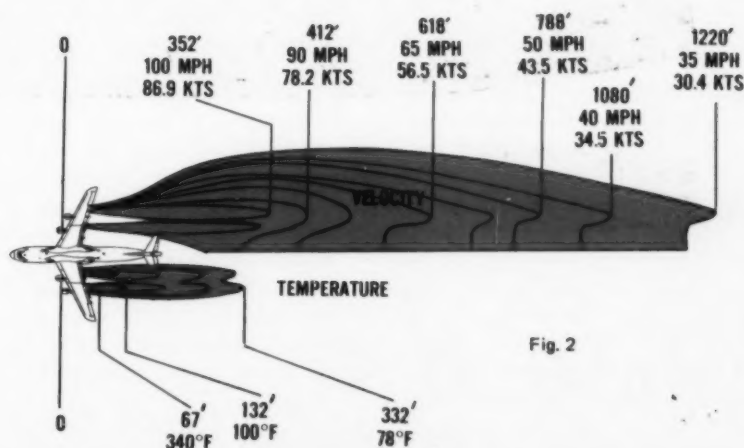


Fig. 2

C-5A BREAKAWAY POWER EPR-3.4

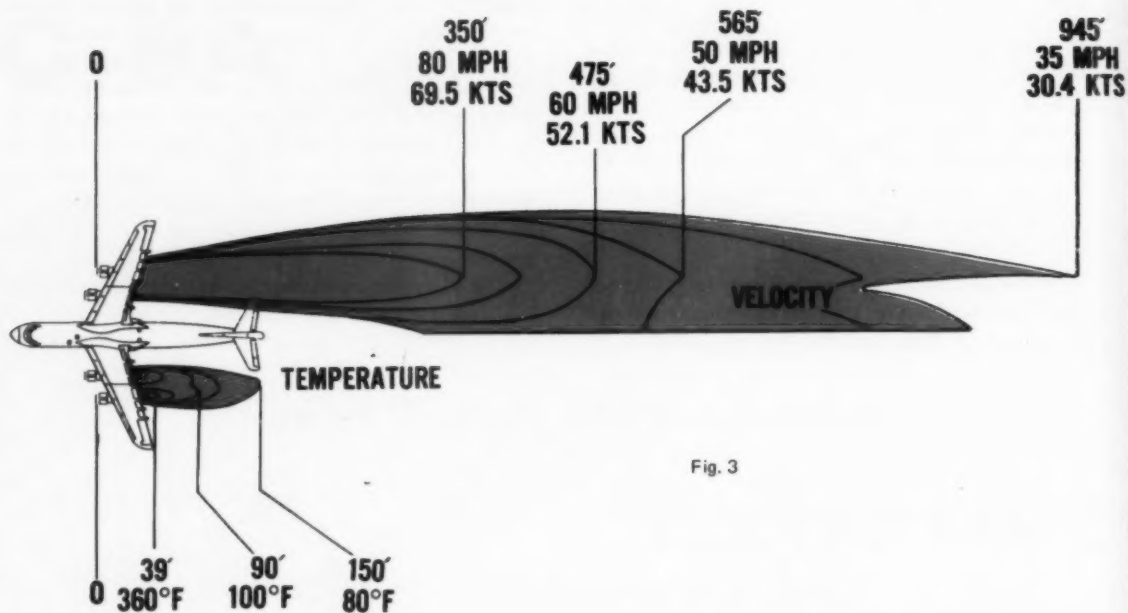


Fig. 3

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C-5A TAXI POWER EPR-1.64

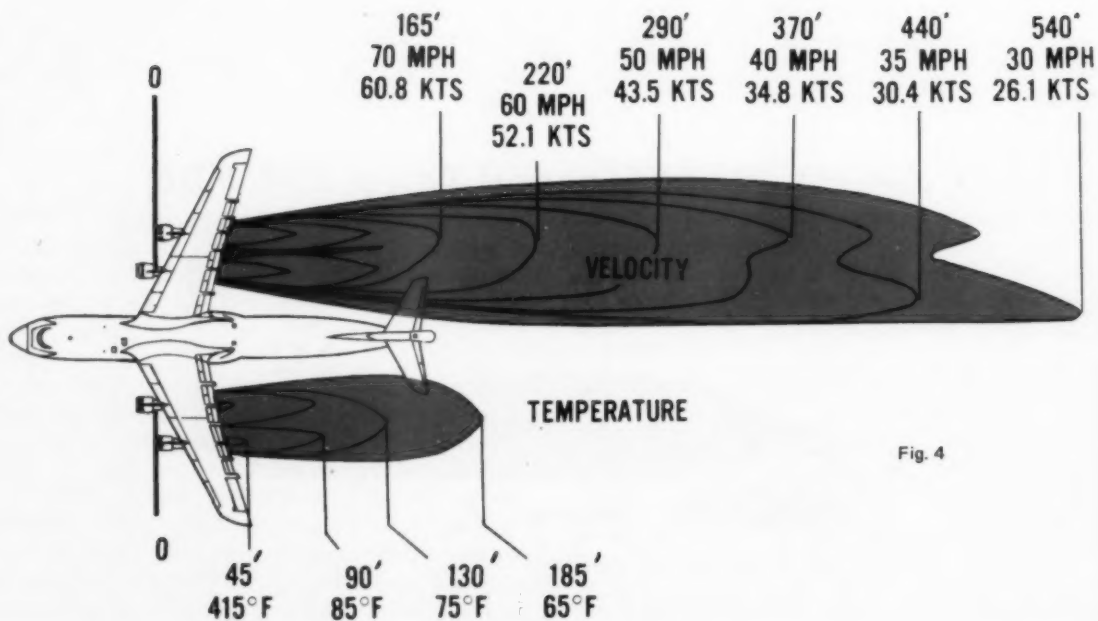


Fig. 4

C-5A IDLE POWER EPR-1.2

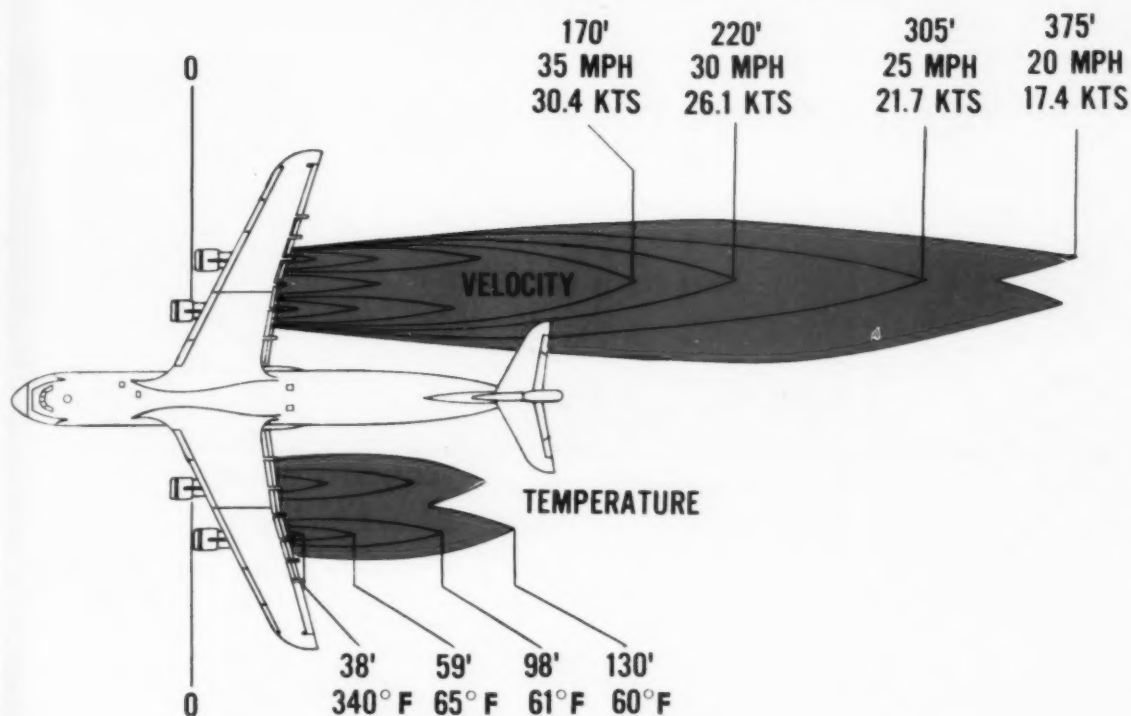


Fig. 5

As can be seen in Fig. 2 the exhaust air flow of the C-5 at *takeoff power* forms into two ridges of high velocity air on the extended centerline between the inboard and outboard engines and a trough of lower velocity air along the extended aircraft centerline. The exhaust of the two engines on either side merge at approximately 350 to 400 feet into an exhaust velocity pattern of about 90 mph. This exhaust has such force and volume feeding it that it is slow to decrease in velocity and will not drop to 35 mph until reaching the overrun area of the runway. Therefore, it would appear advisable to condition the overrun the width of the runway for prevention of erosion by the air velocities indicated. Any areas in which the aircraft engines are to be run up for power checks will also require conditioning aft of the aircraft. C-5A engine exhaust temperatures are not a problem and should not induce sufficient heating of the asphalt to cause deterioration of the binder or to reduce adherence of the asphalt wearing surface to the base. Concrete joint material should not be affected.

C-5 *breakaway power* (Fig. 3) is probably the most critical power setting in regards to the possibility of injury to personnel and damage to other aircraft and support equipment. For this reason, the maximum power setting (EPR 3.4) which could be anticipated for breakaway under the *most* adverse conditions was selected. The conditions which would require this power setting are considered rare. Experience indicates that normal breakaway can be accomplished at approximately 25 percent thrust (EPR 2.0).

Figure 4 shows the exhaust velocity and temperature at *taxi power* setting. Note that the velocity at 165 feet is 70 mph. These velocities decrease in a somewhat irregular pattern until they reach 35 mph between 400 and 440 feet. From the velocities shown and from observations made at Dobbins AFB, it would appear that a good stand of grass is all that is required for normal stabilization along each side of a 75-foot taxiway. Paved shoulders may be required at stations with frequent C-5A operations and poor soil or dry climate.

Idle power (Fig. 5) exhaust velocity and temperature

BLAST DEFLECTION (Idle Power)

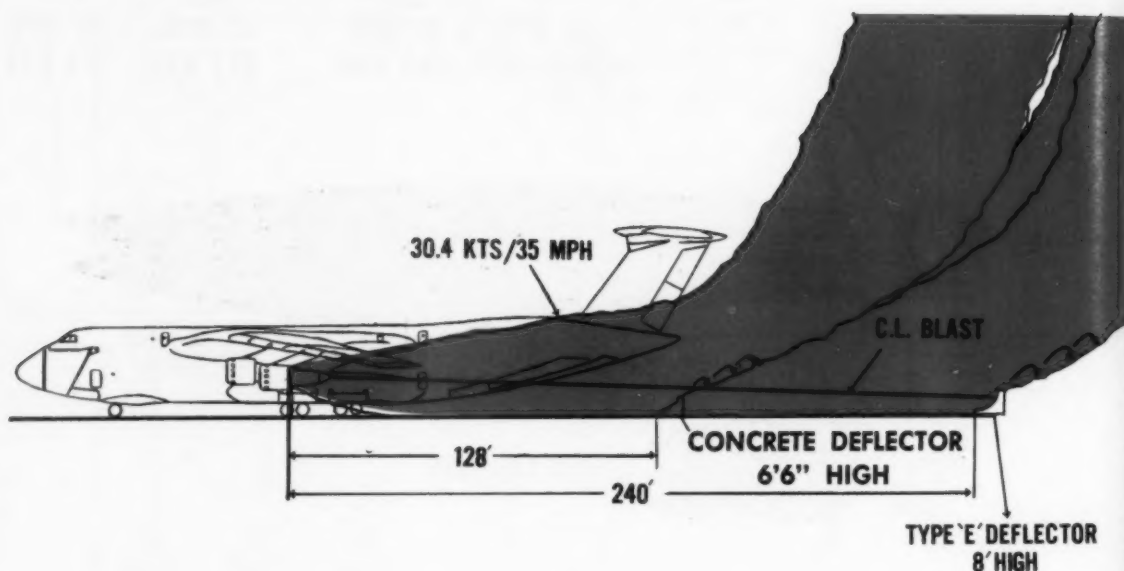


Fig. 6

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pose no problem. Velocity lowers to approximately 35 mph at 170 feet and temperature lowers to 70°F prior to reaching 59 feet.

Figure 6 (above) displays two different exhaust blast deflector applications. The first shows the blast deflected by a concrete shell with dirt fill six feet six inches high placed immediately below the tailcone of the aircraft. This is the type which is used by Lockheed and has proven to be very successful. With this type deflector the blast appears to be drawn downward to the pavement where it impacts, spreads, then encounters the deflector, which turns the blast upwards with a turbulent motion, which in turn deflects the higher strata of the exhaust upward and causes a rapid deceleration of the air movement. The second type blast deflector is the all metal, type E, shown in AFM 88-2 and is the preferred type for C-5 aircraft. Other types are recommended for dual use parking positions where C-141, C-133, C-124 or C-130 aircraft are also to be parked. This type is located at approximately 250 feet aft of the outboard engine fan nozzle and should be about eight feet high, thus the centerline of the outboard engine exhaust will impinge about one-third of the way down from the top of the deflector. The

exhaust hitting the ground in front of the deflector and that hitting the deflector itself will be turned upward and reduced in intensity.

Navy and Marine Corps airfields capable of receiving C-5 aircraft should be familiar with the blast effects associated with these aircraft as affects their facilities. Exhaust effect must be considered in the layout of taxi and parking areas as blast deflectors and shoulder stabilization may be required. Already established parking spots, taxi routes and aircraft handling techniques need to be reevaluated in the light of this latest information. Finally, Lockheed recommends that hold lines be established 150 feet from runways in use by the C-5A rather than the usual 100 feet.

Additional C-5 information in the form of magazine articles and posters has been distributed through Air Force safety channels. If this information would be useful in your safety programs, it may be requested from MAC Safety Division, MAC/IGY or from Air Force Directorate of Aerospace Safety, AFIAS.

Information for this article was furnished by Headquarters Military Airlift Command, USAF.

Introducing...

The Lone Rangermouse!

THE Safety Office of USS RANGER (CVA-61) has come up with an interesting adaption of the standard Anymouse report form which promises to be an excellent aid to safety. The new form is entitled, "The Lone Rangermouse" (see accompanying illustration).


Forms are made available to shipboard personnel by means of containers/collection boxes which are positioned in highly trafficked areas throughout the ship. Commercials on the ship's recreational TV are used to advertise the idea. Completed forms are collected daily and routed to cognizant departments for information, action or comment and are then returned to the Safety Office. Information contained on the completed forms is also used to develop POD notes — and copies of forms which contain information of widespread interest are forwarded to the Naval Safety Center.

The Lone Rangermouse forms have provided the USS RANGER Safety Office with numerous suggestions and information which might otherwise have remained unknown.

The forms are proving to be an important means of communication and a definite asset to the safety program.

Good show!

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**THE LONE
RANGERMUSE**

SAFETY REPORT FOR CVA-61 AND EMBARKED CARRIER AIR WING

"I, AN ANONYMOUSE RANGER TEAM MEMBER, RECENTLY ESCAPED BECOMING AN ACCIDENT STATISTIC. IN ORDER THAT OTHERS MAY LEARN AND BENEFIT FROM MY EXPERIENCE AND OBSERVATIONS, THE FOLLOWING INFORMATION IS SUBMITTED."

NARRATIVE OF EVENTS

When a bird is dropchecked it is required that a safety line be put up to keep people out of the area. The lines are being ignored. Either the personnel don't know what they are for or just don't care.

RECOMMENDATION

It is not only the enlisted men but the senior officers. It is pretty hairy when a man walks under a plane about the time the gear starts to come down.

AMS3, VA-196

/S/RANGERMUSE (SIGNATURE OPTIONAL)

FOWLER



DECK



THE BREAKS OF THE GAME

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LET'S face it. As long as you have competitive sports you are going to have injuries.

Nobody's thinking about doing away with football, for instance, in the name of safety but we *would* like to reduce sports and recreational injuries.

After all, if a key man in an operation is eliminated by an injury on the playing field, he's just as much out of the program as if the accident had occurred on the job.

For the purposes of this article we ran a "quick and dirty" check of all OPNAV 5100/1s (Accidental Injury/Death Reports) submitted by forces afloat (including aircraft squadrons) concerning Navy sports and recreational accidents for calendar year 1969.¹ Unlike naval aviation, which can compare accidents with accident-free hours of flight time, no frame of reference exists for sports and recreational accidents. The statisticians can give us frequency *counts* but cannot provide frequency *rates*.

At the top of the list of the 170 sports and recreational accidents (you guessed it) is good old football. There's no breakdown between tackle, touch or flag but there were 48 injuries reported during this time frame, 38 of which were major.²

Water sports were the second largest injury-producing category and accounted for all seven of the year's fatalities. Running a close third as an injury-producer was basketball, followed by softball.

The fact that there were four times more major injuries reported than minor injuries (see Fig. 1) leads to speculation that, in all probability, many minor injuries were not reported or were taken care of without professional medical treatment. The 1969 tabulation does not reflect all the accidents discussed here. In the pages which follow we have drawn on the first six months of calendar year 1970 as well as on 1969 for specifics.

Ancient Wisdom

Ancient Wisdom: If you're going to knowingly assume the risk of exposing yourself to a risky situation, to lessen the risk you should endeavor. (How was that again, please?) Translation: Figure the odds and hedge.

That's why smart automobile drivers *and* passengers lock doors, fasten seat belts and buckle up shoulder

¹Because of possible updating of reports, the statistics on the first 12-month period of OPNAV 5100/1s in the Safety Center data bank may not be the final word.

²For OPNAV 5100/1 reporting purposes, major injuries are defined as those resulting in five or more lost days or any major bone fracture or dislocated joint. Minor injuries are those necessitating less than five days' lost time and finger fractures without complications.

harnesses. And that's why the smart sports enthusiast, be he the star of a touch football team or a lone scuba diver probing a South Pacific reef, addresses himself to a number of factors well ahead of time with self-preservation in mind. Chief among these factors are:

- Experience and training.
- Physical condition and fatigue.
- Environment.
- Proper equipment.

All are interrelated but let's consider them one by one.

More Ancient Wisdom

Can you stand some more Ancient Wisdom so soon? Read on: If you know what you're doing, you are much less likely to get hurt.

Take this surfing accident for example.

Late one afternoon, an FN went to Sunset Beach, Oahu, along with four buddies from his ship, to surf for the first time. The waves were large and a big one caught him. He was knocked unconscious and he nearly drowned. Luckily help was at hand. After two weeks of hospital treatment he was released to duty.

The would-be surfer's lack of skill and lack of knowledge of surfing waters were cited by the investigating officer as the accident cause. He recommended a shipboard information program to thoroughly familiarize potential surfers with currents and oceanographic characteristics of local surfing waters.

Recklessness

Lack of experience and training is one thing. Recklessness is something else. We're not talking about the times you're playing so hard that you overextend yourself. We're talking about rash lack of caution.

A past president of the AWSA (American Water Ski Association) had something to say about recklessness not so long ago.

"Water-skiing is not inherently dangerous but irresponsible and careless participants are," he wrote. "With but few exceptions the injuries and fatalities that do occur are the result of improper boat operation or inattention, carelessness and recklessness on the part of the skier."

Ski With a Life Vest

Let's digress a bit here while we're on the subject of water-skiing. "Drowning is a basic hazard which can all but be eliminated by wearing an approved flotation device, preferably a vest-type jacket offering adequate buoyancy and protection to the rib cage," the AWSA official states. Such flotation devices have been required in water-skiing tournaments sanctioned by AWSA for some time, with the exception of slow-moving trick riding events.

Continued

Collision with the shore during landings (which pitches the skier forward and out of his skis) is also a major cause of water-skiing injuries, according to AWSA. A Navy man was injured this past spring in just this way. He lost his balance when approaching the bank and fell into two or three feet of water. He fractured a cervical vertebra and spent two months in traction. Although not mentioned as a factor in this particular accident, a boat driver's skill can have a great deal to do with bringing a skier safely to shore.

Are You Up to It?

Physical condition and fatigue: One of the key factors in sports injuries is, of course, physical condition. While it's well known that physical exercise can pep you up sometimes when you're tired, the man who goes into a touch football game or decides to take a swim when he's run down or overly fatigued is just asking for trouble. A swimming accident in 1969 is a perfect illustration. A WO1 was caught by the undertow while swimming with a friend one afternoon and quickly became exhausted trying to reach safety. His friend pulled him out of the surf. Investigators found that he had engaged in strenuous athletics for three hours prior to the mishap. This, they said, could have very well contributed to his rapid exhaustion and near-drowning.

Fatigue is a troublemaker when applied to sports and so is a hangover. *Alcohol and sports do not mix.* You probably can remember any number of guys at the squadron picnic last summer who got clobbered trying to sweat out the booze on the softball diamond, volleyball court or maybe even at the horseshoe pit, all so they could go back and drink some more beer. Not at all smart!

Age Can Be a Factor

"You are old, Father William."

If you've forgotten Lewis Carroll's poem or have never read it, it's worth looking up. Father William, a fit 19th century geriatric type who today would probably jog and eat yogurt and think good thoughts, had a habit, among other things, of standing on his head. He was also quite capable of turning somersaults backwards and, when so disposed, would on occasion steadily balance an eel on the end of his nose. His son keeps at him with the equivalent of "How come you can do all that jazz, Dad?" and the verses end with Father William snapping, "Don't give yourself airs! Do you think I can listen all day to such stuff? Begone or I'll kick you downstairs!"

No doubt there are still some Father William types around but they are, unfortunately, not in the majority. As most of us get older, we get less fit and this downhill trip begins fairly early in life. A study of college students playing intramural touch football, reported to the

annual meeting of the American Public Health Association last year, showed that even in this group the incidence of injuries appeared to increase with age. You don't necessarily have to quit the playing field altogether as you add years — our message here is simply take some precautions to compensate.

Moderation is the key. Nobody who sails a desk all week has any business trying to make up for it all at one time on the weekend. You just can't go for long periods without physical exercise and then expect your body to take the punishment of a hard game of tennis or handball without some side effects. Something's going to give — it may be your ankle or it may very well be your heart. If you have any reason to wonder about your physical fitness, get a medical examination *before* you join the competition or, better still, get a medical examination and then take up some maintenance program of regular exercise such as the new aerobics. (Please see "A Single-Engine Bird," page 26, August 1970 APPROACH.)

How's the Turf?

Environment: Environment is a good all-encompassing word to cover the weather and the condition of the water, court or turf. Needless to say, environment plays a large part in sports and recreation accidents.

Sprains and fractures are all too common in outdoor sports. In the college football study cited earlier, knee and ankle sprains required hospitalization more than any other injury in touch football, the major contributor to intramural injuries.

People who organize a ball game when the grass is wet and the dirt has turned to mud are setting up slides and falls, sprains and fractures. Same goes for tennis on a wet court or skiing when the snow isn't just right. And when it comes to hazardous environment in sports, we hope we don't have to tell you to get off the beach or out of the pool when those beautiful clouds build up and begin to rumble "Thunderstorm."

Check It Out

When you and your buddies organize a game of something, make sure the playing area is level and that there are no holes or other hazards. A Seabee chief was put out of action for more than a month this year when he encountered uneven ground in a football game. As the accident report describes it, he put an "unnatural strain" on his right leg and knee and tore the cartilage. This sort of injury is fairly common. In a softball game, an HMC pitcher's right foot slipped into a hole near the pitching mound and ruptured the achilles tendon in his right ankle. His injury required surgical repair and the chief was off work for approximately two months.



Another leg injury in a softball game took place when an AE3 slid into base and snagged on a steel peg used to hold the base in place. This broke his right leg. (The steel peg, the accident report stated, should have been beneath ground level.)

Condition of the playing field was also a factor in the injury of a lieutenant in a lunch hour touch football game on an athletic field outside the Navy Exchange. He dove for an "out-of-bounds forward pass" and his left arm smacked the ground and a fence around an adjacent tennis court. He was lucky to get away with only a dislocated left elbow. Investigators recommended that playing fields be lined distinctly so players will be conscious of boundaries.

Thin Ice

Thin ice was the environmental factor which led to the death of a young enlisted man at Great Lakes earlier this year. In spite of warnings in the plan of the day and station newspaper and efforts of base security police to keep skaters off Lake Michigan, some time during the weekend he was skating, broke through the ice and drowned.

As we said, *check the environment for hazards before you begin.*

Equipment Counts

Proper equipment: The right gear for the game is vital and you've got to know how to use it. We return to football again — maybe it's because of the season.

If you are going to play regular football, ideally you should have helmets and pads and shoes with cleats. In the 37th annual survey of U.S. football fatalities, made after the 1968 season, football fatalities had risen 50 percent over the preceding period. All of the direct fatalities were the result of injuries to the head, neck and spinal cord. The authors of the survey urged proper

conditioning exercises to strengthen the neck, enforcement of rules against "spearing" (driving your head into your opponent's chest, stomach or kidney area) and special attention to properly fitted helmets.

Proper gear used correctly, so necessary in rough competitive team sports, is also essential in solo activities such as skiing, especially since an injury can occur in a comparatively isolated and unfriendly environment. Earlier this year, a Navy lieutenant was put out of commission for four months in a skiing accident near Lake Tahoe. When he fell, his left ski binding failed to release and his leg was broken. Investigators recommended "ensuring that personnel who engage in skiing are advised of the importance of having ski bindings adjusted according to their ability."

Prompt Medical Attention

If you do get bashed in a team sport or twist your ankle while jogging down the flight deck, get thee to a medic. Immediate attention to a sprain, for instance, can prevent complications which can keep you off your feet for days. Prompt medical attention is particularly important in eye injuries.

A seaman was playing football in an unorganized game at a park. While he was tackling another player, somebody's elbow found his right eye. He considered the injury only minor and didn't report to the station dispensary until the following day. The medics diagnosed his injury as a fracture of the right orbit (the bony cavity which holds the eyeball). He was admitted to the hospital and treated for a week and he will have to report back to the doctors every two weeks for the next six months.

Inevitably, the questions come up in any review of sports accidents, "Is it worth it?" "Would we be better off without organized and informal sports programs?"



The consensus is *Yes*, it's worth it, and *No*, we would not be better off. Here are some typical comments from OPNAV 5100/1 reports on sports injuries:

"Impractical to limit athletic activities by introducing more than reasonable precautions."

"Discontinuance of interdepartmental sports would have an adverse effect on morale."

"The only known action that could be taken in an effort to minimize this type of accident (flag football injury) is not to participate in contact sports. However, this is unrealistic in view of the Navy Department's stress on physical fitness and sanctioning of flag football. It is considered that the potential for personnel injuries, in varying degrees of seriousness, will always be present where physical fitness, including participation in organized athletics, is promoted. Such a hazard appears to be a calculated risk of the results to be obtained."

Without a doubt we will continue to have organized and disorganized sports and we will continue to have

injuries. Nothing said here, for instance, is likely to prevent such accidents as that of the Navy man who got injured at the beach when a couple of guys in a human pyramid started fighting and the structure collapsed. Or the Navy man who was bucked off a horse in a rodeo and was kicked in the shoulder or (would you believe?) the Navy man who was struck in the head by a bull's horn while riding the bull in an authorized recreation program staged by another service in Seville, Spain. But giving serious consideration to the factors discussed above — experience and training, physical condition, environment and proper equipment — we should be able to keep sports injuries to a minimum.

With a little common sense and a few precautions you can have a piece of the action and stay healthy at the same time. ▲

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TABULATION OF FORCES AFLOAT SPORTS/RECREATION INJURIES
CALENDAR YEAR 1969

Sport/ Recreation	Injuries		Fatalities	Total
	Major	Minor		
Football	38	10		48
Water Sports				
Swimming, diving	7	2	4	13
Snorkle diving	1			1
Scuba diving			2	2
Skin diving	1		1	2
Water-skiing	2			2
Boating	3	1		4
Surfing	2			2
Basketball	18	7		25
Softball	10	1		11
Recreational shooting, hunting	4	1		5
Handball	2	2		4
Skiing	4			4
Volleyball	3	1		4
Bicycling	3	1		4
Sledding	3			3
Sports parachuting	3			3
Sunbathing	2			2
Hiking, climbing	2	1		3
Wrestling	2			2
Bowling	2			2
Roller skating	2			2
Weight lifting	1			1
Judo	1			1
Ping-pong		1		1
Baseball	1			1
Tennis	1			1
Horseback riding	1			1
Track	1			1
Parallel bars	1			1
Coaching Little League*	1			1
Flying model aircraft**	1			1
Miscellaneous***	12			12
Totals	135	28	7	170

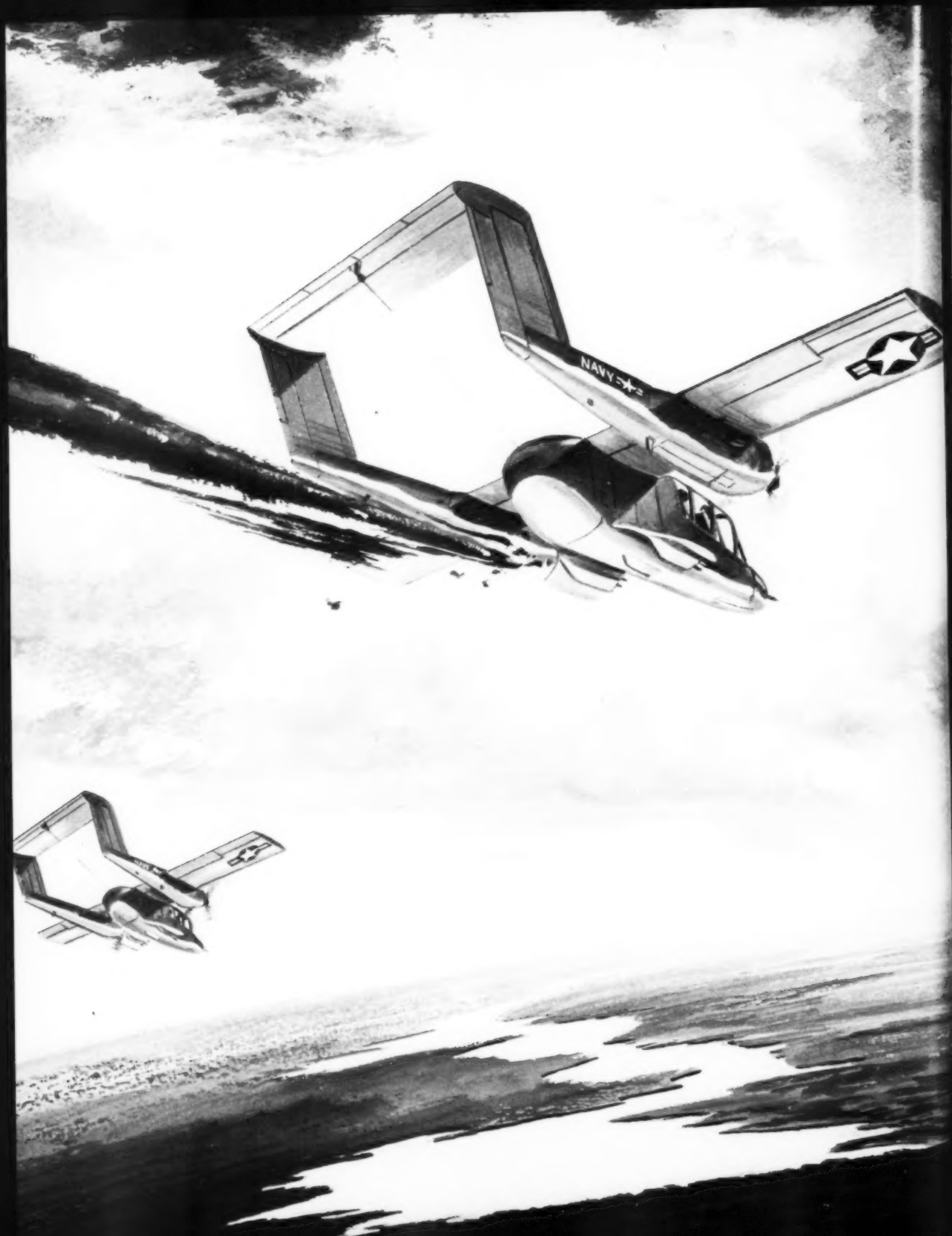
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*Coach broke his ankle demonstrating base running.

**Non-fatal electric shock when model aircraft flew into high tension wire.

***Reports simply say "organized sports."

Fig. 1



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BUCKED

from a Bronco

THE NARRATIVE which you are about to read was sent to us by one of the occupants of an OV-10A involved in the first ejection by two Navy pilots from a *Bronco* in a combat zone. The ejection system "worked as advertised."

The aircraft was the lead aircraft in a flight of two which engaged a group of heavily armed enemy entrenched in rice paddies in a northern valley in the Mekong Delta. Operating beneath a low overcast, the fire team destroyed the enemy positions and silenced the heavy automatic weapons fire.

As the two *Broncos* flew towards home base, the crew of the lead aircraft felt an explosion and the wingman reported that a large section of the port engine had blown off. The lead pilot informed his observer that their aircraft was on fire. We now pick up the account of the observer who is also a pilot.

"The pilot headed the aircraft for a large open field," he begins. "I took control of the aircraft while he prepared for ejection and notified Control of our intentions. The aircraft felt very heavy and wanted to roll and dive and had to be muscled to remain at 1000 feet and 110 knots. The pilot reported that all trim was gone and the control surfaces were binding. He took control of the aircraft again.

"Then there occurred a second explosion and the wing section outboard the boom was covered with flames. I noticed that the trailing edge had started to curl forward and was glowing red and white hot. I notified the pilot of these facts and reported that I was ready for ejection to be pilot-initiated and that I had elected to leave my mike cords plugged in. I was informed that we were going and braced back and down against the seat. I had my feet flat on the deck in front of me, my head back against the seat and my arms tucked in and crossed. I remember feeling an initial movement of ejection although it was not violent. I then sensed a gentle descent — I have no recollection of chute deployment.

"The first thing I saw was the pilot dangling from his canopy below me. He was about 50-75 feet away and

30-50 feet lower than I. I then heard an explosion and saw the plane crash approximately 200 meters away. I looked up into my canopy — it was fully deployed and beautiful.


"The pilot hit the ground and tumbled backwards. I made the mistake of watching the ground for my hit. I noticed a pretty rapid sink rate. I hit sideways, rolling over on my ankle, then my side. I knew that my ankle was hurt but my first concern was my chute, which had not deflated and was dragging me across the dried-up rice paddy. I rolled over on my back and released the two koch fittings. This freed me from the chute and it blew away. I then released my seat pan and looked for the pilot. He was on the radio. I got up and limped around and waved to the orbiting aircraft that we were OK.

"The pilot handled the radio communications while I drew my .38 cal. pistol. I then spotted eight to 12 men coming towards us from about one kilometer away. One of the aircraft confirmed that they were friendlies by a low pass over them. We had taken cover behind our seat pans until their identification was established. The dozen or so ARVNs from a nearby outpost hailed and welcomed us and began to pick up the scattered debris from the wreck.

"About 10 minutes had passed since ejection. Ten minutes later a *Chinook* arrived. The helo crew helped us gather our gear and whirled us away. Communications were handled professionally by the on-scene commander and rescue was quick, efficient and successful.

"The pilot had a stiff neck and I was having difficulty walking on a sprained ankle. Looking back on it, I have full confidence in the LW-3B seat and associated survival equipment. This was the first ejection from a Navy OV-10A in a combat zone and it worked exactly as advertised. No violent motion occurred, the two chutes came down near each other and both of us were patrolling the Mekong Delta again within a week.

"My visor was scratched by pieces of the canopy but my eyes were fully protected. Visual inspection of my nomex flight suit and nomex flight gloves revealed heavy singeing from the fire drawn around me on ejection. The backs of the legs of both our flight suits were charred from the rocket blasts of the ejection seats also but neither of us suffered any burns. Both of us elected to leave mike cords plugged in, thereby insuring communications until the last moment before ejection. Because the terrain below was a large, flat, dried-up rice paddy, I elected to keep my seat pan attached.

"All safety and survival equipment used worked perfectly and insured that two Navy pilots would soon be back to engage in further combat actions against the enemy." 

Complacency

"WHEN I saw two CH-46s circling at about 4000 feet, I considered immediate pickup likely," said a pilot after ejection. "I probably became complacent — I failed to perform even the rudimentary survival actions with my gear."

Time was no factor here — it was a controlled ejection at an altitude of 10,500 feet. The pilot says he was "amazed" at the time it took to get to the water. He did not take advantage of this time.

- He waited until the last minute to deploy his raft and then did so at an altitude too low for it to have time to inflate.

- He entered the water without having inflated his life preserver during parachute descent.

- He did not immediately shed his parachute.

Getting away from his gear posed no major problems, he says, although his left foot did get tangled in shroud lines. He could see the shroud lines, parachute and uninflated raft underwater and was able to get rid of the shroud lines with his right foot. The entire raft and chute "package" then sank.

One more thing — the pilot was not wearing the required survival vest. If rescue hadn't been so prompt he could have found himself in somewhat serious trouble in the 62° water with no raft and no signaling devices except some pencil flares.

Incidentally, how's *your* survival training?

Protection Pays Off

A ROUND in an M-60 jammed during firing aboard a helicopter and the magazine exploded. The gunner's helmet visor was down, his nomex flight suit sleeves were down and he was wearing flight gloves. His protective clothing prevented any injury except a slight flash-burn of the lips.

Backs into Antenna

AFTER the start of an F-4J, an AMH3 had removed the huffer hose and was exiting from beneath the aircraft when he inadvertently backed into the TM Package Antenna of an AIM-7 missile hung on the after port fuselage station. The antenna penetrated his jacket, shirt and skin just below his left shoulder blade. The small puncture wound did not bleed much so he felt it was unnecessary to report to sick bay. Having worked the night before, he was secured early and went home to bed. He awakened from a nap a few hours later feeling short of breath. Later that night he reported to sickbay where a chest x-ray revealed a collapsed left lung.

This petty officer had been specifically briefed about the hazards of the TM package antenna during start and preflight of the aircraft. He assisted in starting two similar aircraft just prior to his injury.

All commands utilizing the AIM-7 missile and TM Package Antenna should take action to prevent such an injury in the future. It is strongly recommended

that all personnel with injuries involving puncture wounds report to sickbay immediately.

This Is a Test!

"POP QUIZZES" was what they used to call them in school and they were a pretty good idea. If you didn't know when one was coming you were more apt to do your homework.

Not too long ago a pilot who had ejected encountered trouble with his radio in the water but it worked just fine when he was back in the squadron. A test scheme has now been set up to improve survival radio know-how. Without warning, any pilot in the detachment can be called on to take his radio out of his survival vest and, with his eyes closed, demonstrate its proper use. This, said an endorser to the accident report, quickly reveals to the pilot any doubt or hesitancy he has concerning correct use of his radio.

Sounds like a very good idea!

Keep the Faith!

A PILOT who recently ejected over water exhibited a lack of confidence in some of his survival gear. His concern over the life of his strobe light actually prolonged the SAR effort and delayed his rescue.

- He did not inflate his LPU-2P because he did not think it would support him in the water and he was afraid it might get in his way while boarding his liferaft.

notes from your flight surgeon

• He was so sure that the line used to secure his pencil flare gun to his survival vest had broken after the flare gun shot from his hand when he fired it that he did not look for it. After rescue he found the gun in his gear, still suspended from its retaining line.

• He was afraid to let the strobe light flash continuously for fear it would burn out. (The company which developed the strobe light states that it will operate approximately nine continuous hours.)

As one endorser to the accident report put it, "Extensive training in the operation and limitations of all survival and rescue equipment is

essential for all aircrews. In this case it would have enhanced the rescue considerably."

For Want of a Shoe

SAFETY SHOES issued to a lance corporal just a few hours before the tailhook of an F-4 came down on his right foot didn't do him any good. He wasn't wearing them.

The hook, on an F-4 which had experienced an inflight utility hydraulic failure, had been chained in the up position following an arrested landing to facilitate removing the aircraft from the runway. The lance corporal and

another Marine were lowering the hook, after a crash crewman had removed the chain, when the hook slipped and struck the lance corporal on his right foot. His injury will require skin grafting and he will probably lose his little toe.

There are no standardized procedures for performing this maintenance, the squadron report stated. Such standardized procedures and proper supervision *might* have prevented this accident. The lance corporal's injury would probably have been averted, or at least lessened, if he had been wearing his safety shoes.

"The fact remains," the squadron report stated, "that this squadron still has personnel working on the flight line without safety shoes due to the relatively slow response of the supply system to provide odd sizes. All outstanding orders have been updated to priority 02 and immediate response is anticipated."

What is the situation in your squadron?

Bird Strike

"ONCE again the old dictum of flying with visor down and oxygen mask in place has prevented serious, if not incapacitating injury. On parachute landing something struck the pilot's hardhat and visor over the right eye area with such force as to *completely shatter* his visor. The pilot sustained absolutely *no* injury. I do not doubt that if the pilot's visor had been up he would have received very serious injury." ◀

Investigating Flight Surgeon



"You can always tell those who gave up smoking by the way they grind out candy wrappers with their heel."

By LCDR P. A. Ruth
VS-33 ASO

'Goggles Down, Check All Chocks, Tie-Downs and Loose Gear about the Deck, Stand By to Start Engines!'

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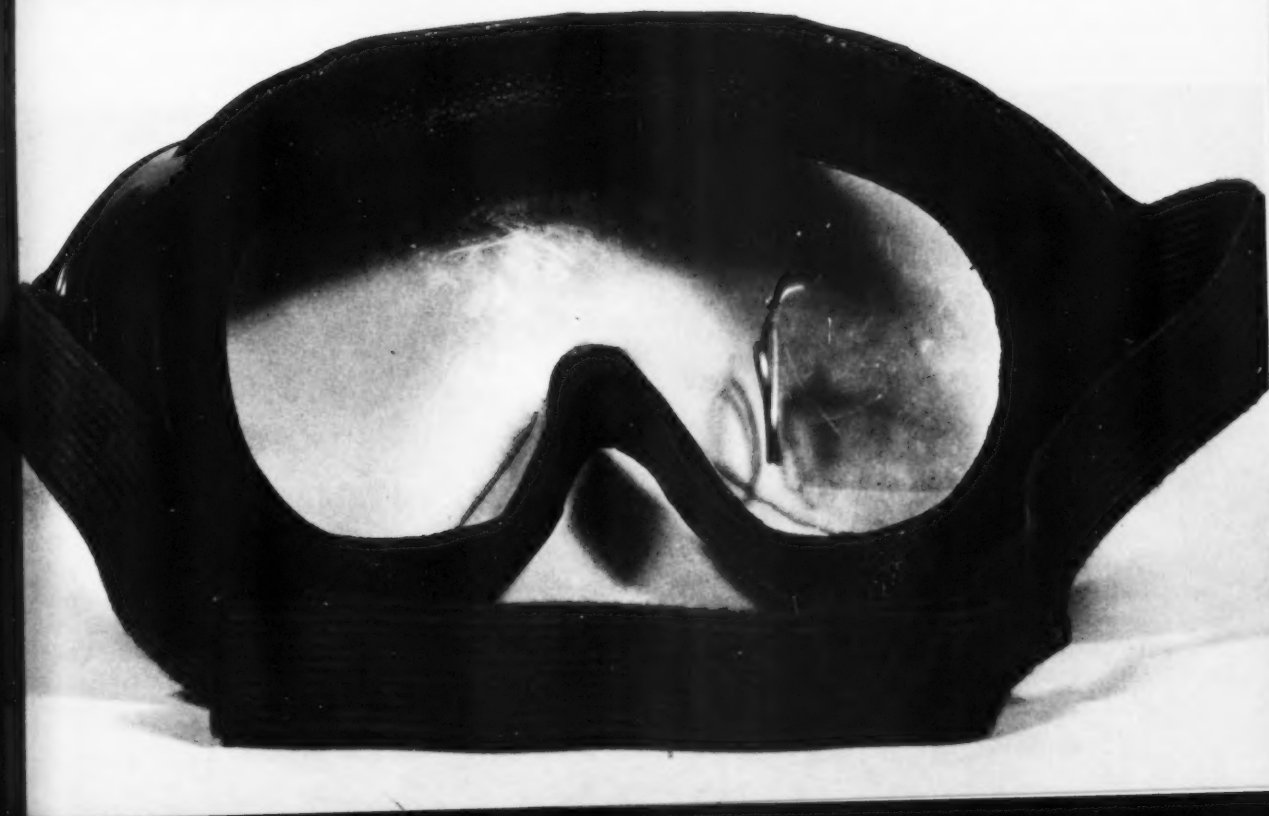
A PHRASE associated with carrier flight operations that is very familiar to all flight deck personnel. It is also a phrase that this sailor, a maintenance flight deck troubleshooter, believes in strongly and to which he affords his closest personal attention. Takeoff power was applied to an S-2E on the catapult while our troubleshooter was standing near the island. The propwash swept up a piece of .04 gage shear wire (shown in pictures) from the flight deck. This small piece of wire impacted the right side of the plastic lens of his safety goggles and popped it from the rubber frame. Only a small loop on one end of the wire prevented the other end of the wire from piercing his eye. Had he not been wearing his safety goggles at the time, the probable results are readily apparent. His smile is worth a thousand words as to the value he places on his goggles.

I have retained the goggles and wire, utilizing them as training aids for safety training lectures. Hopefully, this article with the associated pictures, will convince some unsuspecting soul who faces the daily perils of the flight deck that goggles or other safety items which he is required to wear in the performance of his duty may some day save his eye, his limb or even his life. ◀

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INCIDENTALLY

speaking. . .

AIRCRAFT incidents which involve personnel error should not be taken lightly by units operating naval aircraft. The mere fact that they don't count against a unit's aircraft accident rate does not lessen their seriousness. If it requires man-hours and dollars to replace broken parts on aircraft because personnel inside or outside of them fouled up, then its obvious effect on the Navy's resources cannot be discounted or minimized.

A random selection of aircraft incident briefs are cited below. They all involve personnel error and should have been prevented. The fact that they weren't is good reason to read and learn from them.

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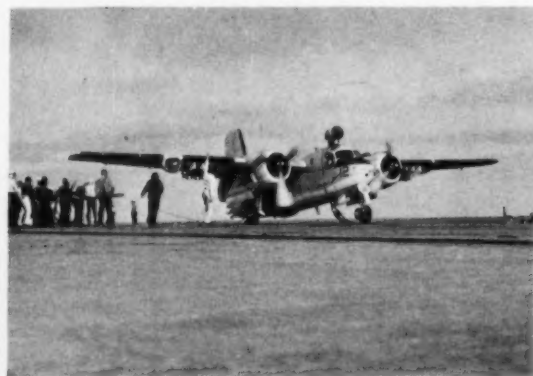
● After a P-3 had landed, a crewman reported to the pilot that he had seen something go by the aircraft. The aircraft was shut down and the crew inspected the main landing gear. Nothing was amiss. Since no nosewheel steering difficulty was noted, the nose gear was not inspected at this time. The aircraft was started and taxied to the ramp. After shutdown a more thorough



inspection of the aircraft was conducted and at that time the port nosewheel assembly was found to be missing. A search of the area located all components except the locking bolt, associated washers and the self-locking nut. This was the eleventh landing following a change of both nosewheel assemblies. After analyzing the markings on the hubcap and lock sleeve during investigation, the ASO could find no evidence of the presence of a lock

bolt and determined that it was inadvertently left off when the port nose gear assembly was installed. Failure of maintenance personnel to conduct proper installation integrity checks and quality assurance inspections caused this incident.

● During an S-2 cat shot the MAD boom extended and struck the deck causing a slight wrinkling of the



boom and damage to the MAD head cover. About an hour prior to the flight the boom had been manually cranked out to change the head. The technician who performed the work couldn't remember removing the crank after he completed the job. None of the crewmembers inspected the aft section of the electronics compartment sufficiently to notice that the crank was still installed in the manual extend/retract MAD boom

socket. The crank was discovered when a crewman went aft to crank the boom in after its inadvertent extension during the cat shot. The aircraft was subsequently diverted to a nearby air station and landed without further incident. The investigation revealed:

- The retract cable was broken at the drum resulting in the inability to manually retract the boom.
- Normal operation of the electrical extend/retract system.
- No discrepancies in the mechanical locking system.
- The MAD boom could be pulled out and pushed in by hand with the crank engaged.
- The drive motor could be operated without turning the gearbox or handcrank (with the crank engaged) by activating the ground bypass switch.
- The pilot cannot be positively sure that the mechanical lock is locked during preflight without dropping the radome, going into the hell-hole and crawling forward to visually inspect the locking mechanism.
- With the handcrank removed and the mechanical lock visually checked unlocked, it is impossible to apply enough force to the boom to pull it out or push it in by hand.
- Procedures established by the MIM and a squadron CAMI concerning electrical extension and retraction of the MAD boom were not complied with.
- Normal aircraft preflight required by NATOPS was not complied with.



Although the technician stated that the boom extended and retracted electrically with the handcrank installed, it is doubtful that it did. In his haste to complete the work in time for the next launch it is believed that he *thought* he saw the boom retracting as he came outside the aircraft because that is what he *expected* to see. The cause of this incident was failure of the technician, collateral duty inspector, plane captain,

two crewmen, copilot and pilot to inspect the electronics compartment in sufficient detail to see and remove the handcrank prior to flight. A lot of people had a chance to take a close look but didn't.

• While in flight the No. 4 generator out light illuminated in a KC-130F. One reset was attempted with negative results. The engine was secured and the aircraft landed at an airfield without further trouble. Investigation showed that the generator control panel rack was shorted out due to corrosion caused by overflow from the left-hand urinal at an undetermined previous time. No need to go into any detail on this one, it's pretty obvious what the corrective action should have been.

• An A-6A was making an initial 40-degree visual dive for target identification. When a 4G pullout was attempted at 5500 feet AGL, aft control stick movement was limited to approximately one inch of travel. The pilot immediately and abruptly shoved the control stick forward and then brought it fully aft with both hands. Momentary binding was noted and then the stick broke free. The aircraft entered an accelerated buffet until stick pressure was relaxed. Pullout was completed at 2000 feet AGL. A climb was made to 17,000 feet MSL at 90 percent rpm and the aircraft was slowed to 225 kias for a control check. Gentle stick movement aft was possible with no binding noted. The pilot then put the aircraft into a 90-degree bank, simultaneously added 100 percent power and pulled the control stick fully aft. A flameout occurred as the starboard engine accelerated to 100 percent. The pilot leveled the wings and accomplished a normal relight. An emergency was declared and the aircraft made an uneventful landing at a naval air facility. Postflight inspections revealed that an Adel clamp had been lodged in the control crank assembly area beneath and aft of the pilot's seat. A clamp of this type is not normally used in this area, however, an Adel clamp was missing from electrical wiring aft of the pilot's seat. The Board suspected that this clamp had worked loose and gained entry into the control crank assembly. Also found in this area was a standard Navy flashlight lens and a piece of curled plastic one-half inch by three inches. These were discounted as the culprits of the control jamming. It was suspected that the flameout occurred due to engine acceleration demands coupled with rapidly increasing angle of attack. No engine discrepancies were noted during postflight inspection. This type incident could very well have resulted in the loss of an aircraft and crew. Improperly securing clamps has led to disasters in the past. The fact that other debris was found in the area of the control crank assembly emphasizes the need for thorough inspections of aircraft to ensure that they are



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free of loose gear or foreign material.

• A technician was assigned to install a new rear seatpan in an F-4J. After removing the rear seatpan and lumbar backrest, he left the backrest lying between the starboard intake and fuselage. As the aircraft was being preflighted, a different technician was ordered to complete the installation. He carried a rear seatpan and backrest to the F-4 and installed them without noticing the backrest which had been removed. During preflight the pilot saw the backrest but he was not concerned because he had been told that someone might be still working on the rear seat. The RIO was distracted and did not see the loose backrest. When the inflight



retracting probe was cycled during pretaxi checks, the backrest was caught in the probe door. Taxi and engine runups were normal. As the aircraft became airborne the exposed portion of the backrest began to flap violently in the wind. Two straps with metal rings attached hit upon the rear canopy with sufficient force to cause several pieces of plexiglass to be chipped from the inside. The pilot immediately returned to the field and made a routine landing. The primary cause of this incident was aircrew error in that the presence of the backrest on an external section of the aircraft should have been challenged by both the pilot and RIO. A contributing cause was maintenance supervisory error in that neither the removal of the seatpan nor subsequent installation received a proper quality assurance inspection. As the C.O. stated in one part of his endorsement, "It has been reemphasized to all aircrews that the final responsibility for the safe operation of an aircraft lies with them. Aircrews are briefed to accept no situation concerning an aircraft about which they are not fully informed."

The optimum result of an effective aviation safety program is accident prevention. This can be broadened to include incident prevention. Aviation units which devote the same energy to the investigation of an aircraft incident as that expended on an aircraft accident generally find themselves among the *leaders* in naval aviation safety. ◀

When an aircraft declares an emergency, all concerned must give immediate attention in giving assistance. Too many times delayed action by flight leaders, wingmen and facilities either from failure to communicate or to establish priorities have resulted in major mishaps. In this incident the actions taken were prompt and correct, resulting in the prevention of an accident.

Hot Flight

AMPHIBIOUS Force operations have come a long way in the past decade compared to operations of Korean War vintage. Troops and supplies are being offloaded and sustained with much greater speed and efficiency than ever before. However, as with all things which move, occasionally it is necessary to come to slow speed when an emergency arises or a material casualty occurs.

A formation of three CH-46s was enroute to the beach from their home aboard an LPH. The pilot of the aircraft in the No. 2 position saw the utility hydraulic hot light illuminate on the master caution panel. He immediately isolated the utility system from the No. 2 control boost system and informed the flight leader of his problem. As soon as Lead was advised of the trouble he turned the formation back toward the ship, passed the lead to No. 2 and took up a wing position on the new leader, ready to aid and assist in any way he could.

Meanwhile, aboard the new lead aircraft the crew chief checked utility hydraulic lines and reported them hot just as the pilot saw his utility hydraulic pressure drop to zero. Concurrent with this, the No. 2 boost pressure began to fluctuate and slowly drop. The pilot informed the LPH of his difficulties and advised that he was returning. He then selected No. 1 control boost and No. 1 SAS (Stability Augmentation System) and descended to 300 feet. Smoke poured into the aft cabin but the crew chief reported no visible fire. To keep the smoke out of the cockpit the pilot ordered all windows and hatches closed, which isolated the smoke in the aft cabin.

Upon receiving the word that one of its birds was inbound in trouble, the ship cleared the entire aft end of the flight deck. (There's just nothing like a ready deck when you need it.) When the helicopter pilot with the emergency reported about three miles out, he was immediately cleared by the tower for a straight-in

approach. The crash crew was standing by and all was ready in case the helicopter landed with a fire aboard. As it turned out the hot suit specialists were not needed.

Investigation disclosed that the blower in the fluid cooler assembly failed and allowed the utility hydraulic system to overheat. The overtemperature of the hydraulic fluid caused expansion and overpressure until a rupture occurred inside the hydraulic pump. The escaping hot hydraulic fluid caused the smoke.

There was a happy ending for everyone in this incident except the maintenance types who had to fix the bird as quickly as possible. When faced with the problem the pilot proved he knew his systems, quickly isolated the trouble, let others know about it and got back safely. The flight leader acted in just the way a leader should. He didn't say, "Keep an eye on things" or "What do you recommend?" He made an immediate decision to return to the ship, passed the lead to the crew in trouble and assumed a position as wingman to render assistance. The crew chief checked aft and kept the pilot informed of his findings. The ship cleared the deck and made ready to receive the helicopter. That's cooperation and coordination of the highest order by many people. ◀





Thunderbumper NEAR MISS

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I WAS flying south on V-1 in a CRT US-2B out of Navy Norfolk. ATC advised of traffic at 12 o'clock, 9000 feet. I was at 8200 feet in thunderstorm updrafts, turbulence and precipitation. As I popped out of the clouds I saw my traffic, a C-121, coming at me head-on at the same altitude. Abrupt maneuvering prevented a mid-air but this would not have been possible had I not popped out of the clouds in time.

Instrument flight procedures require attitude flying in thunderstorms and acceptance of an inadvertent climb or descent in updrafts or downdrafts. I was heading south in an updraft at an assigned altitude of 8000 feet. The other aircraft was heading north at an assigned altitude of 9000 feet, probably in the downdraft side of a CB cell. Each aircraft proceeded into the cell with the updraft affecting my *Stoof* and the downdraft working on the C-121,

which established the necessary vertical momentums resulting in both aircraft being at the same altitude.

Shook-up Mouse

The best way to keep from being placed in this predicament is to avoid thunderstorm activity when possible. We realize, of course, that this will not always be possible and that you may find yourself

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT, PREVENT AN ACCIDENT

unavoidably in a thunderstorm penetration situation. In the April '70 *APPROACH* we published an article on severe weather avoidance. It emphasized the fact that you should let ATC know, as far in advance as possible, of any problems being encountered and they will try to help. Never hesitate to advise ATC when you are having trouble maintaining assigned altitude because of thunderstorm updrafts, downdrafts or turbulence. If the situation is rough enough, ask for increased separation. Don't think that you will look silly if you ask for help and then find that you don't really need it. The first time one of these thoughts pops into your mind is the time to request assistance. Do not wait until the situation has deteriorated into a potential disaster before letting ATC know of your predicament. A little embarrassment is better than a big accident. As the saying goes, "A mid-air can ruin your whole day."

Look Ma, No Hands!

GROPING ABOUT on a moonless night is no bag of giggles for any pilot. So having finished an instrument hop my crew breathed a sigh of relief as I taxied the CH-46 off the duty to the fuel pits for a drink. Once in the pits I beeped back to 94 percent Nr to gentle down the wind blast and ground beat. After refueling and heading out of the pits, I left the engines beeped back as I was having no trouble taxiing with a 90-degree crosswind from my left — about 15 knots.

We headed down the taxiway when I noticed a KC-130 parked to my left with his running lights on. I remarked to my copilot, "I hope that aircraft isn't turning up." No sooner were the words out of my mouth than I saw his spinning props and my 46 made a sharp right

turn for the grass, rocks and ditches past the edge of the taxiway.

Things were a bit busy as I hauled the helo into the air, called for my copilot to turn on the SAS and ATS, beeped up the engines, turned on my landing and hover lights and called ground control to warn any other aircraft on the duty that I was heading their way. Fortunately the duty was clear so I landed on it well away from the KC-130 and taxied to my line — like they say, with no further incident.

In reviewing NATOPS I found no mention of taxiing at 94 percent either pro or con. This procedure seems to be a habit of 46 drivers. Considering the CH-46 is a hard beastie to taxi and 15 knots is a healthy crosswind component, taxiing at 100 percent Nr would have been a good idea. Also on this dark night I should have called ground control for verification of the KC-130's intentions. It wouldn't hurt for all heavies to watch out for us little guys and watch their six for taxiing aircraft. If I had been a light starched wing

instead of a helo, an AAR, not an Anymouse, would have been submitted.

Helo drivers remember: Potential for flight does not cease when the radio is set to ground control.

Rotormouse

NATOPS doesn't include every action that might be dreamed up but if you CH-46 pilots are in the habit of taxiing with less than 100 percent Nr maybe it should be spelled out that it isn't a good idea. As far as the rest of your comments are concerned we could not agree more. No flight is over until the aircraft is shut down and tied down in the chocks.

TA-4F Trim Problem

I'M A BIT embarrassed to relate this experience since it resulted from my omitting a small (but very important) item from my poststart checklist. However, perhaps it can save some other pilots from the trap I walked into.

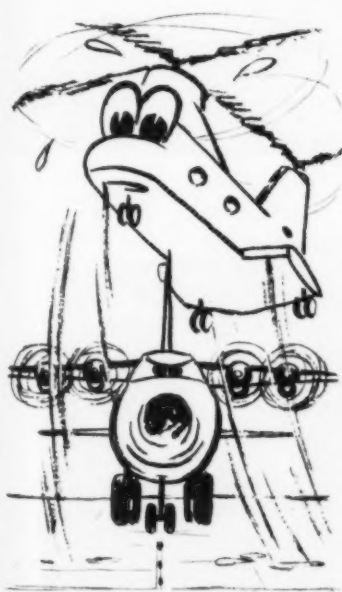
I was test hopping a TA-4F after NARF rework and came to the last item before landing, the Control Disconnect. "Trim level at 300 knots, slow to 200 knots, disconnect, accelerate to 300 knots and check roll rate." It was right wing heavy, about 12 degrees of roll per second, and after letting the bird go to 60-70 degrees angle of bank, I began horsing it back level and commenced trimming out the stick force. Pretty soon I became aware that the stick force was now heavier than before. I quickly looked at the left aileron to see if the trim was working. Yep, but what the heck was going wrong? I was now bracing my elbow against the canopy sill and even got my husky rear seat crewman to help push the stick to the left. Control stick steering mode helped some but we were on the verge of going

out of control. We fought it all the way back to a landing in this manner and I realized that if this had been an A-4E or A-4F model instead of a two place TA-4F, I might have been forced to punch out.

After I got back to the ready room and had a chance to think over the event, the culprit became apparent to me. My hurried glance at the left aileron had shown the trim tab to be at full throw all right but wait a minute! It should have been full DOWN — not full UP! Great Scott, no wonder my arm was so sore! I had flown the last 10 minutes of the hop on manual control, with an inherent right roll PLUS full right (wrong) aileron trim. The mechs had connected the tab backwards. I missed checking it during the poststart check and it didn't become apparent until the Control Disconnect was pulled because until then the aileron trim motor drives the hydraulic servo "neutral" position (which was hooked up correctly) and all the follow-up tab does is provide a corresponding neutral aerodynamic balance. But once you disconnect — WATCH OUT! That tab is all you've got and 60-70 pounds of lateral stick pressure to hold the wings level can tire an arm out fast.

Wiser Mouse

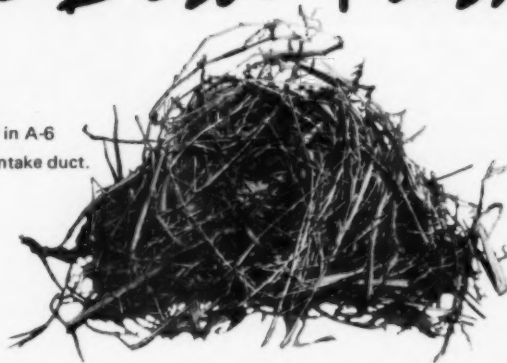
This is an excellent testimonial to the value of completing all prescribed checks and in this case the complete poststart check included trim tab operation. It should also serve as an excellent warning against making unwarranted assumptions, e.g., the assumption that movement of the trim tab indicated correct operation. This incident shows that not only should all prescribed checks be completed — they should be completed in an alert and thoughtful manner. ◀



Wrong Type Bird Farm

or Birds Can Get Into the Darndest Places

Bird's nest found in A-6
air conditioning intake duct.



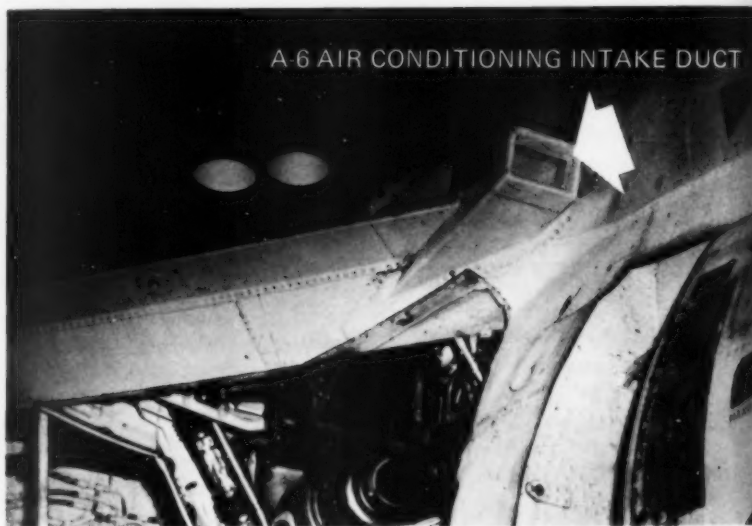
THESE photos illustrate what can happen when an aircraft is stored for more than a few days at a time between flights. This A-6 was stored outdoors from 12 May to 8 July and then brought in for a calendar inspection. During the storage period, an enterprising bird with maternal instincts investigated this metal structure, became convinced it had distinct possibilities as a good place to raise a family and so had commenced to set up housekeeping. Unfortunately, from the bird's point of view or fortunately from the maintenance point of view, the aircraft was towed into the hangar, opened up and the nest discovered prior to the egg-laying stage.

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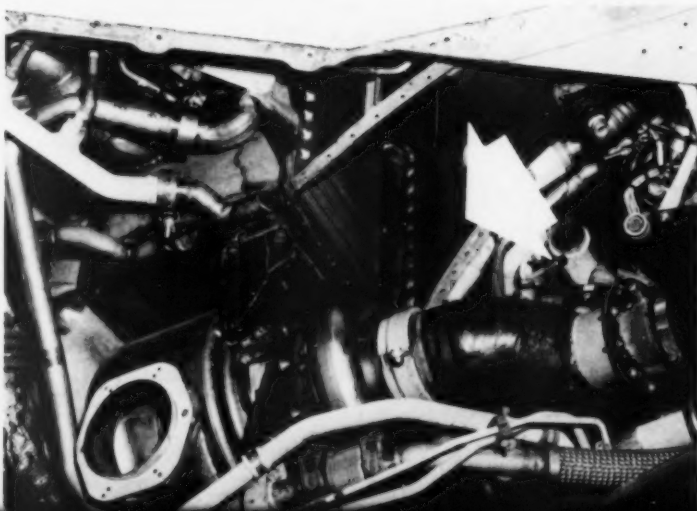
If this aircraft had been turned up prior to the discovery of the nest against the air conditioning system's heat exchanger (it was well hidden and would have been extremely hard to see during a preflight inspection), many kinds of things could have happened — not a one of them pleasant or desired.

These photos emphasize the need to *always* conduct a thorough inspection of any aircraft prior to flight — it's the only way to go. ◀

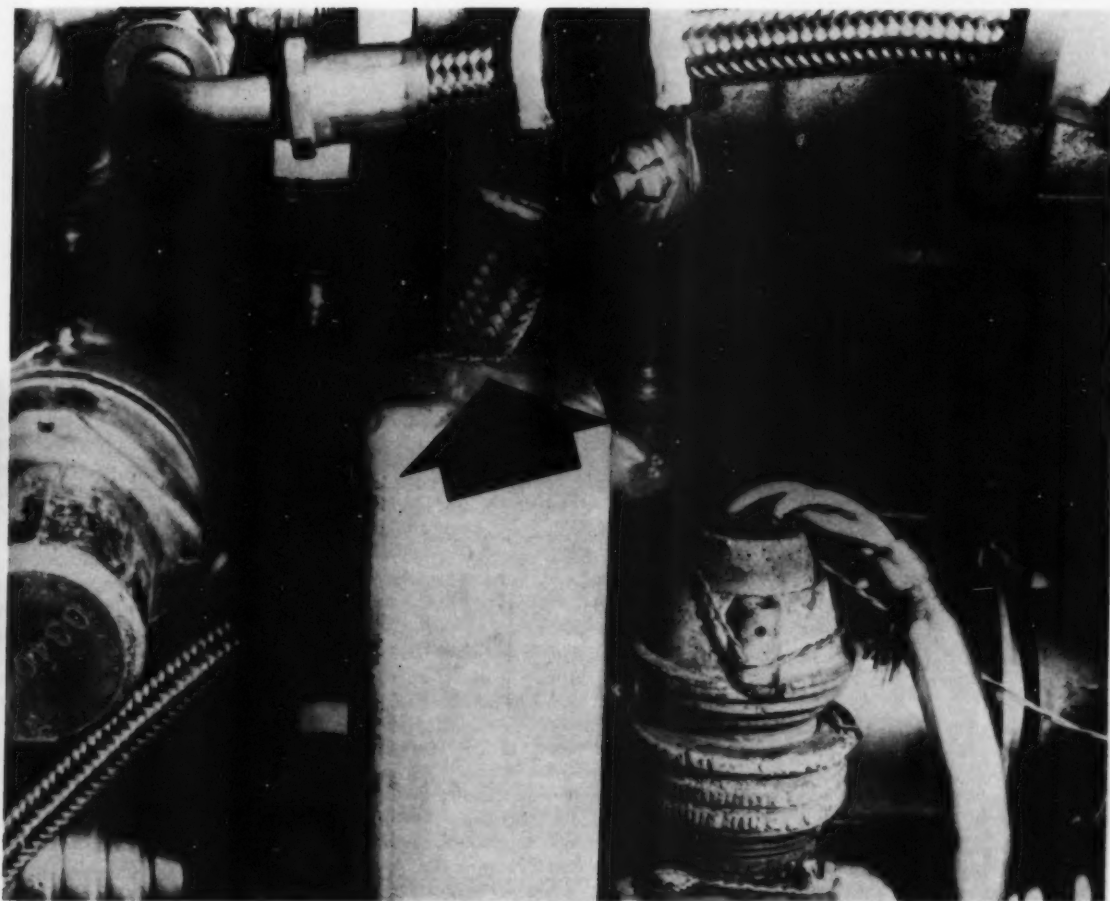
Arrow indicates location of nest found against heat exchanger.



A-6 AIR CONDITIONING INTAKE DUCT



MURPHY'S LAW*



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Check and be sure!

HERE'S one that has the potential for starting a chain reaction which could result in an inflight fire; all UH-2A/B/C operators and maintenance personnel please take note.

The Emergency Fuel Actuator (P/N 3124169) mounted on the T58-GE-8B engine can be installed improperly with the motor facing aft vice properly facing forward. If this item is installed facing aft, the actuator case will not provide sufficient clearance for a fuel line (P/N 37C300473P101) and can result in chafing, which if not corrected, would ultimately result in fuel line failure. Results of such a failure are many and varied and can all be disastrous. ◀

* If an aircraft part can be installed incorrectly, someone will install it that way!

LETTERS

An expert is a man who makes mistakes quietly.

Ace L.

"True or Mag" Strikes Again!

MCAS Futenma, Okinawa - Thank you for your cogent article entitled "True or Magnetic" in the June 1970 edition. On behalf of myself may I say that although I remember being taught it, I don't remember thinking that it was very noteworthy, at that time.

As a footnote to your article - after asking four of our weather forecasters whether or not sequence reports were given in true or magnetic degrees and receiving a unanimous "magnetic" - I gave them a copy of the article to read!

James R. Berg
H&MS 36 MAG 36

NAAS Meridian, Miss. - In the article "True or Magnetic" in the June issue of APPROACH there is an implication that all surface wind direction reports received by an aviator are in true compass degrees. This is not the intent of the writer, I'm sure, but in this instance a misunderstanding might occur.

Surface wind information issued by the weather office, i.e. pilot briefing, weather vision presentations, forecaster to pilot transmissions, enroute ARTC or FSS reports are in true compass degrees. However, surface wind information issued by control towers and radar final controllers is read from wind indicators calibrated for magnetic compass degrees (as required by NAVAIR Notice 13950, 2 April 1968 and current FAA regulations).

Pilot knowledge of the above should be universal.

L. T. Grigsby
CWO USN

NAS South Weymouth, Mass. - In regard to the June APPROACH "True or Magnetic" I have the following comments to make:

Would you believe that an experienced A-4 jock (900 hours in type), after a tour operating from a SATS field at Chu Lai, RVN, believed that the A-4 should land on the downwind side because the aircraft

weathercocks and will go off the upwind side?? He since has been cured, as he nearly ran off the side of our 7000-foot runway in a gusty crosswind condition (he also forgot his flaps since he was too busy fighting the aircraft trying to keep it on the runway).

One other item on surface winds. The tower here at NZW gives winds to the pilots in magnetic, not true as do the weather men. Is this standard at all bases? If not, I think that this could foreseeably cause an accident. Trying to figure out "true or magnetic" on final is not the time to be confused!

MAJ E. A. Homer
Operations Officer
MARTD South Weymouth

FPO, San Francisco - In the June issue of APPROACH the article "True or Magnetic" relates an incident resulting from confusion concerning whether airport surface winds are given in true or magnetic direction. The article states that forecast surface winds given by meteorological facilities are true vice magnetic. It further implies that actual surface winds given at the time of landing are also reported to the pilot in true direction. Misunderstanding of the fact was reportedly widespread.

One cause for this confusion may lie in the fact that H.O. Pub. No. 216 (1967 Reprint) *Air Navigation* states on page 122 that wind direction "is normally given as true, however, takeoff and landing instructions at airfields usually give wind as coming from a magnetic direction." This statement seems to contradict the actual and implied statements of the June APPROACH article.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

Perhaps you can clarify this matter more fully and thus avoid a repeated incident like the one reported. When, if ever, are actual/forecast aloft/surface winds given as magnetic at the time of landing/takeoff?

J. A. Mason
LTJG USNR
VR-21

● Evidently the article "True or Magnetic" in June '70 APPROACH struck a responsive chord as evidenced by the above letters. However, after rereading the article very critically, it is hard for us to understand the statements of the two readers saying that the article contains a false implication. One letter states "...an implication that all surface wind direction reports received by an aviator are true compass..." the other writer says, "...It further implies that actual surface winds given at the time of landing are also reported to the pilot in true direction..."

The following quotations are taken from the article and are the only references which appear to be germane to the possibility of false implication.

● "...neither pilot was aware that the forecast surface winds were given in true compass degrees rather than magnetic..."

● "...Had the pilots known how forecast winds are given (true or compass heading)..."

● "...very few of those sampled concerning this fact were aware that winds reported by weather offices are in true direction..."

● "...Surface winds reported by meteorological facilities are in true vice magnetic direction..."

None of these four statements appears to imply either that all surface wind reports received by an aviator are true compass or that the surface winds reported to the pilot at the time of landing are given in true direction.

The answer to MAJ Homer's question is: Yes, it is standard that all control towers give wind direction in magnetic degrees. This is correctly stated in

CWO Grigsby's letter.

To answer the question posed by LTJG Mason, the surface winds given at the time of landing or takeoff (and here we assume you mean at the precise time of landing or taking off, which would be tower wind information) are always reported in magnetic degrees. *FORECAST* (surface and aloft) winds are always reported in true direction, never magnetic (this is wind information received at weather stations, aerology offices or any other meteorological facility).

One final thought. We are considerably alarmed at the "magnetic" answer given by the four weather forecasters to the question asked of them by J. R. Berg! It is bad enough that pilots get confused but where do the weather guessers go to get straightened out?

Light Filters and Compasses

FPO, San Francisco - I am writing in regard to the SEEK-2 Kit, Packet-2, in which there are two plastic light filters, one red and one blue. I have been in many formal and informal discussions as to what their purpose is. Some say that they are to be used to cover the strobe light so the strobe light will not be mistaken for ground fire by rescue forces. Others say the filters are to cover conventional flashlights for night E&E purposes. Both answers sound logical to me.

Recently there has been some message traffic concerning a blue directional flash guard, FSN 6230-917-6692, and IR filter, FSN 6230-783-5713YC, but these messages

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P.S. Signed letters are preferred but Anymouse reports will do.

do not state that these items are replacing the two plastic light filters installed in the SEEK-2. I hope you can filter some light on this matter.

I would also like to comment on CAPT A. W. Massey's letter in the March 1970 *APPROACH*, pages 46-47. I personally feel that the compass under discussion should be worn on the wrist while flying in a hostile area but should not be worn on the metal watchband or near the watch. The compass has its own nylon band and I see no reason why it should be worn on the same wrist as the watch.

Most ejections or bailouts due to

enemy fire are usually at one to two thousand feet altitude. This doesn't give the aviator much time to prepare himself for a landing. There are some things which must be done during this short parachute descent. I consider orienting himself to be one of the pilot's most important tasks. Without the use of a compass for this orientation, the pilot could lose all sense of direction on landing, especially if he landed in thick jungle foliage. The pilot would not or could not move in any direction in some cases. However, there are a few instances in which the pilot must move and it would definitely be to his benefit if he knew the correct direction in which to travel.

A WestPac PR

● The flash guard and filter stock numbers you mention are Air Force numbers. These items are *not* replacing the filters in the SEEK-2 Kit. The red and blue filters in the kit are for intended use as lens covers on the strobe light.

The wrist compass is part of the SEEK-2 Kit. If the compass is procured as a separate item, the position in which it is worn or carried is usually at the discretion of the user. Since this is a magnetic compass it should not be used in proximity to metals that would affect its accuracy.

Also, remember the additional hazard created when a nylon watch band is exposed to excessive heat. ◀

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Credits

This month's cover by Craig Kavafes depicts another visitor from the not-so-distant past. The immortal F-4F *Wildcat* takes off to join up with memories of the other great aircraft of WW II. Painting Courtesy Grumman Aircraft, Bethpage, N. Y. Pg 24 Photo by Eamon Kennedy courtesy *The Miami Herald*.

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begin
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